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Number 3

Research Toward the Development of Predictive Models for Archaeological Site Distribution in the Kaskaskia River Drainage

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for the
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ABSTRACT

The present study represents a preliminary investigation aimed at developing models capable of predicting archaeological site locations within the Kaskaskia River drainage area and adjacent Mississippi River floodplain and bluff zones. The data base for this analysis is derived from the survey records filed with the Illinois Archaeological Survey at the University of Illinois at Urbana. A sample of archaeological sites from eight archaeological resource zones within this area has been utilized in order to define areas of high archaeological potential. The limitations of the existing data base have reduced the possibilities of developing refined predictive models at this time. Despite these limitations of the data base, which include poor locational information and haphazard sampling procedures, the results of the present study should prove useful in the formulation of future archaeological research goals in this area and in the development of resource management policies.

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I. INTRODUCTION

The following study represents an attempt to formulate a series of general models for the Kaskaskia River drainage region which will relate specific site locations to particular physiographic units. These models are primarily aimed at evaluating the present state of information which exists in regard to prehistoric settlement occurrences in this drainage basin. They should not be viewed as models capable of predicting site locations in this region. Past sampling methods and generally inadequate survey records, preclude, at this time, the possibility of statistically generating valid predictive models for any portions of this study area.

The Kaskaskia drainage basin has been divided into eight arbitrary units which are referred to here as archaeological resource zones. These zones include the Kaskaskia River floodplain, the Kaskaskia River bluffs, the Kaskaskia tributary floodplains, the Kaskaskia tributary bluffs, the Kaskaskia uplands, and the Kaskaskia-Mississippi bluff confluence area. Also included in this study area, although not directly part of the Kaskaskia drainage basin, are the Mississippi River floodplain and Mississippi River bluff zones. These zones were included because of their proximity to the western Kaskaskia drainage network, and because the Kaskaskia River itself drains directly into a portion of the Mississippi floodplain.

The archaeological resource zones mentioned above fall within recognized natural physical regions although they do not perfectly coincide with these regions. A distinction, therefore, is made in this study between archaeological resource zones and natural physiographic regions. Physiographic regions contain specific geological, hyrological, pedological, or floral features which make one region distinct from another. The boundaries between these regions are often sharp and clearly defined. On the other hand, the archaeological resource zones delineated in this study, are based on what were apparently the

primary areas of prehistoric habitation in the Kaskaskia River basin and adjacent Mississippi River floodplain and bluffs. Boundaries between these zones are diffuse and poorly defined archaeologically. These primary areas of site occurrence are defined solely by the archaeological sampling preferences of a limited number of individuals who have worked in this area over the past fifty years. The site locality models established in this study are, therefore, the products of these preferences, and do not necessarily reflect actual prehistoric settlement patterning.

The data for this study is limited to those archaeological sites which are recorded in the files of the Illinois Archaeological Survey at the University of Illinois-Urbana. Nearly 70% of the recorded sites have been utilized in the present study. No additional site surveys nor site collection studies were incorporated in this project. Many sites were excluded because their forms lacked adequate or correct information. In addition, the records presently on file (to Jan. 1978) indicate notable gaps in the present data base of this area. For example, it is estimated that nearly 95% of the presently defined study area has never been systematically surveyed. Some areas, particularly in the upland till plain zones of the Kaskaskia basin, have never been sampled. The reliability of any models formulated for such poorly sampled areas must be suspect.

This study has not attempted to correlate specific cultural or temporal units to specific physiographic units or general resource zones. All sites have, instead, been presented solely in terms of their presence or absence. It is assumed, however, that culture-space studies conducted for specific cultural time periods will have potential validity in future studies of this area.

The results of this study should be very carefully considered within the context of present data base gaps and areal sampling biases. The models

presented in this study essentially represent ranked frequency occurrences of archaeological sites in specific resource zones. Within the defined resource zones themselves, some physiographic units, e.g. old channel banks, demonstrate apparently higher frequencies of prehistoric utilization than do others. It is the present author's contention that to a great extent, the apparent "prehistoric preferences' actually reflect the archaeological investigator's sampling preferences. Therefore, if future studies concentrate on those areas which presently reflect higher site occurrences, the original sampling biases of a region will only be reinforced. If a future predictive model is to have any statistical validity in any region, all physiographic units or zones must be systematically sampled, regardless of the number of archaeological occurrences known to exist on any given set of physiographic features.

The following sections describe in detail the archaeological resource zones and natural physical regions of this study area. The physiographic units recognized generally in the various zones of this area are then utilized in specific site locality tabulations. Ranked frequency occurrences and selected significant correlations form the basis of the resource zone models in this study.

II. AREA OF INVESTIGATION

Natural Physiographic Divisions

The area of investigation includes the entire drainage network of the Kaskaskia River in the state of Illinois (Figure 1). The western edge of this area also includes the Mississippi River floodplain and adjacent uplands draining into the Mississippi River. The site records of the following counties have been utilized in this research:

Bond	Monroe	Shelby
Clinton	Montgomery	Washington
Fayette	Moultrie	Champaign
Madison	Randolph	Douglas
Marion	St. Clair	

The greater part of the area under investigation lies within the Kaskaskia drainage region. This area is part of the Springfield Plain which consists primarily of dissected Illinoian glacial till. Further sub-divisions within this plain have been recognized by geographers, naturalists, soil scientists and geologists (Willman and Frye 1970; Harris et al. 1977). For example, the state of Illinois has been divided into 14 distinct natural physiographic divisions (Schwegman 1973). The present study area includes, in part, 5 of these divisions; two of these are further sub-divided. Within the Kaskaskia drainage basin, the study area includes the following natural divisions (Tables 1 and 2).

1. Grand Prairie Division (4): Grand Prairie Section (4a)

The Grand Prairie section of this study area falls within Montgomery, Shelby, Champaign and Douglas Counties. This zone consists of rolling morainal and outwash terrain, including the more prominent Shelbyville and Bloomington morainal systems. Except for the stream valleys and morainal ridges, topography in this zone is relatively level and inconspicuous. Most of this area within

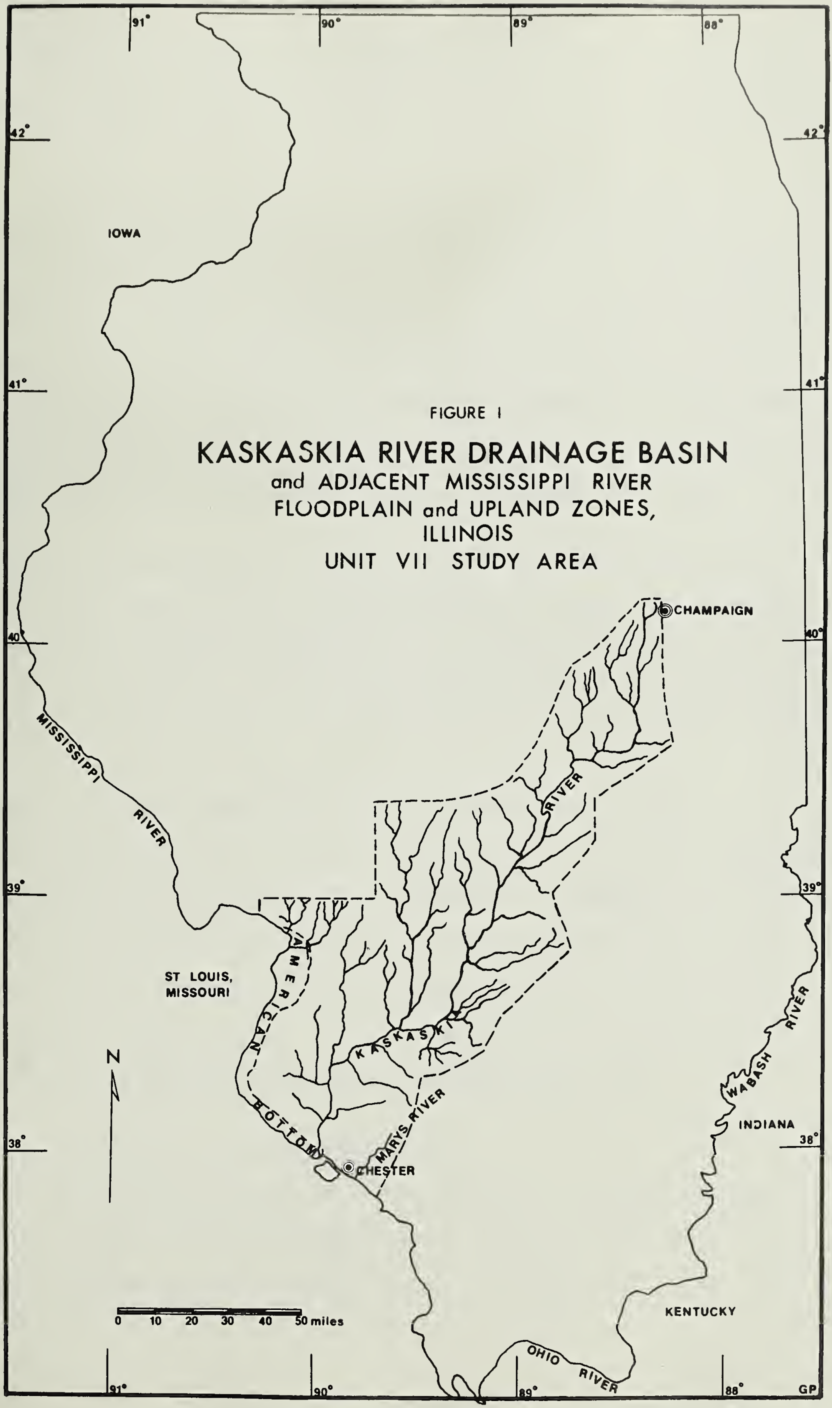


FIGURE I
KASKASKIA RIVER DRAINAGE BASIN
and ADJACENT MISSISSIPPI RIVER
FLOODPLAIN and UPLAND ZONES,
ILLINOIS
UNIT VII STUDY AREA
91°
90°
89°
88°
42°
41°
40°
39°
38°
IOWA
CHAMPAIGN
MISSISSIPPI
RIVER
RIVER
ST LOUIS,
MISSOURI
AMERICAN
BOTTOM
KASKASKIA
MARYS RIVER
CHESTER
N
WABASH
RIVER
INDIANA
KENTUCKY
OHIO
RIVER
0 10 20 30 40 50 miles
GP

the Kaskaskia drainage consists of Woodfordian age moraine and ground moraine. The Shelbyville Moraine marks the southern limit of this area (Schwegman 1973: 16).

2. Southern Till Plain Division (9): Effingham Plain Section (9a)

The Effingham Plain section is a level to dissected till plain covered almost entirely by Illinoian age glacial till. This area encompasses most of the Illinoian till area south of the Shelbyville Moraine and includes portions of Bond, Clinton, Fayette, Madison, Marion, Monroe, Montgomery, St. Clair, Shelby and Washington Counties within the Kaskaskia drainage. The Kaskaskia River cuts through this plain in a southwesterly direction (Schwegman 1973: 22).

3. Southern Till Plain Division (9): Mt. Vernon Hill Country Section (9b)

This zone touches on Monroe, Marion, Randolph, St. Clair, and Washington Counties within the Kaskaskia Drainage and is primarily distinguished from the Effingham Plain section by its hilly topography and bedrock exposures (Schwegman 1973: 22).

4. Middle Mississippi Border Division (8): Glaciated Section (8a)

This zone consists of "a relatively narrow band of river bluffs and rugged terrain bordering the Mississippi River Floodplain..." (Schwegman 1973: 20). Within the present study area this zone occurs only in Madison and St. Clair Counties. Its most prominent features are abrupt limestone cliffs, sinkhole terrain and deep loess deposits. The glaciated section was formed by both the Illinoian and Kansan stages of glaciation (Schwegman 1973: 21).

5. Ozark Division (11): Northern Section (11a)

"The Ozark division consists of the Illinois part of the Salem Plateau of the Ozark uplift from northern Monroe County southward, and includes the glaciated sandstone ravines in Randolph County" (Schwegman 1973: 24). This

section occurs in Monroe, St. Clair, and Randolph Counties in the present study area. It consists of rugged bluff terrain and is marked by limestone outcrops, steep bluffs, ravines, caves and numerous upland sinkholes. Part of this zone was glaciated during the Illinoian stage of Pleistocene glaciation, and nearly all of the area is covered by deep loess deposits (Schwegman 1973: 25).

6. Ozark Division (11): Central Section (11b)

This section occurs in the area under discussion, only in Randolph County and is distinguished from the Northern section primarily by its sandstone outcrops and steep ravines. All of this section was glaciated during the Illinoian glaciation (Schwegman 1973: 25) and was subsequently covered by Wisconsin age loess deposits.

7. Lower Mississippi River Bottomlands Division (12): Northern Section (12a)

The Northern section of this bottomland division includes the Mississippi River floodplain from Alton to Chester, Illinois. It occurs in Madison, Monroe, St. Clair and Randolph Counties. This area was formed by glacial flood waters, and following the last glacial episode the topography in this zone was influenced by meandering channels of the Mississippi River. Major creeks draining this area have also cut through the floodplain and deposited fill into the surrounding lakes and marshes and have formed prominent colluvial outwash and alluvial fans. Soils consist primarily of alluvial silts, sands and clays (Schwegman 1973: 26-27).

Previous archaeological surveys have not necessarily focused on the regional physiographic divisions just described. Instead, surveys have been undertaken in specific zones within these larger regions. These zones have usually included particular river valleys or specialized upland environments. This project intends to utilize these survey zones in relation to the organizing criteria of this study which are archaeological resource zones.

Eight archaeological resource zones are distinguished in this study (Fig. 2). Some of these (such as the Mississippi floodplain) are identical to areas defined in the Natural Divisions of Illinois (Schwegman 1973). These archaeological zones include: the Mississippi River floodplain; the Mississippi River bluffs and adjacent uplands; the Kaskaskia River floodplain; the Kaskaskia River bluffs and adjacent uplands; the Kaskaskia tributary floodplains; the Kaskaskia tributary bluffs and adjacent uplands; and the dissected upland till plain within the Kaskaskia drainage network. An eighth zone consists of the bluff areas at the point where the Kaskaskia River exits its floodplain and enters the Mississippi River floodplain. This zone, which is not critical to the present study although several site locations occur within its borders, is referred to here as the Kaskaskia-Mississippi bluff confluence zone.

Each of the archaeological zones has distinct physiographic characteristics. Many physiographic features common to one area do not occur in another. The correlation of physiographic units between zones is not possible except at a most general level. For this reason, eight separate models have been produced. Existing physiographic complexity within this drainage region suggests that the creation of a single predictive model for the state of Illinois may well be unfeasible.

Archaeological Resource Zones

1. Mississippi River Floodplain

The Mississippi River floodplain zone includes the alluvial floodplain region of the Mississippi River in the state of Illinois, situated between Alton and Chester (Fig. 3). This zone adjoins the Mississippi River bluff and upland region. It includes all floodplain zones presently existing in Madison, St. Clair, Monroe and Randolph Counties. This zone extends nearly 80 miles between Alton and Chester and is referred to generally as the American Bottom. This latter designation

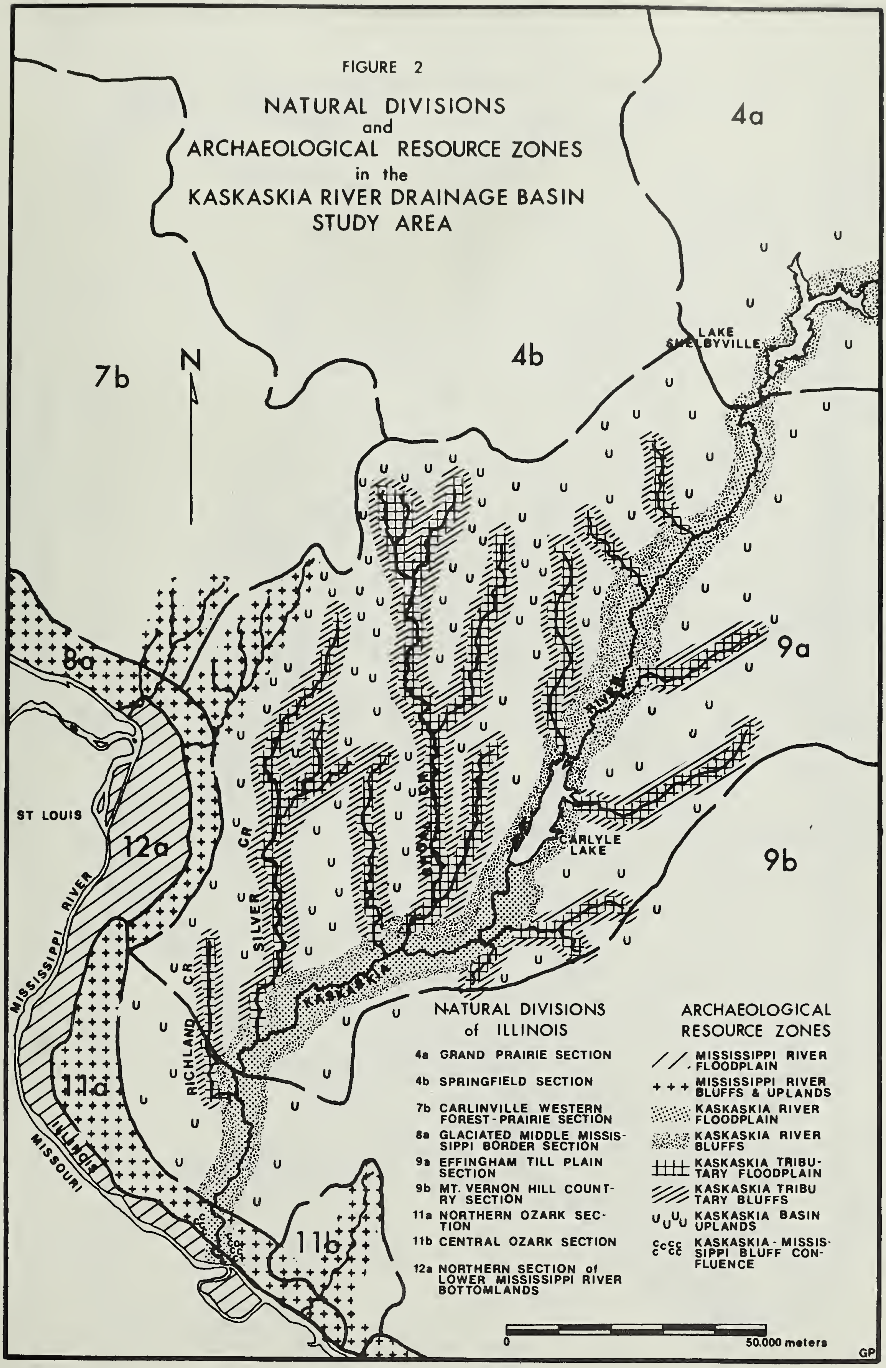


FIGURE 2
NATURAL DIVISIONS
and
ARCHAEOLOGICAL RESOURCE ZONES
in the
KASKASKIA RIVER DRAINAGE BASIN
STUDY AREA
4a
4b
7b
N
LAKE SHELBYVILLE
9a
9b
8a
12a
11a
11b
ST LOUIS
CARLYLE LAKE
MISSISSIPPI RIVER
MISSOURI
ILLINOIS
SILVER CR
RICHLAND CR
KASKASKIA
RIVER
NATURAL DIVISIONS of ILLINOIS
4a GRAND PRAIRIE SECTION
4b SPRINGFIELD SECTION
7b CARLINVILLE WESTERN FOREST-PRAIRIE SECTION
8a GLACIATED MIDDLE MISSISSIPPI BORDER SECTION
9a EFFINGHAM TILL PLAIN SECTION
9b MT. VERNON HILL COUNTRY SECTION
11a NORTHERN OZARK SECTION
11b CENTRAL OZARK SECTION
12a NORTHERN SECTION of LOWER MISSISSIPPI RIVER BOTTOMLANDS
ARCHAEOLOGICAL RESOURCE ZONES
MISSISSIPPI RIVER FLOODPLAIN
MISSISSIPPI RIVER BLUFFS & UPLANDS
KASKASKIA RIVER FLOODPLAIN
KASKASKIA RIVER BLUFFS
KASKASKIA TRIBUTARY FLOODPLAIN
KASKASKIA TRIBUTARY BLUFFS
KASKASKIA BASIN UPLANDS
KASKASKIA-MISSISSIPPI BLUFF CONFLUENCE
0
50,000 meters
GP

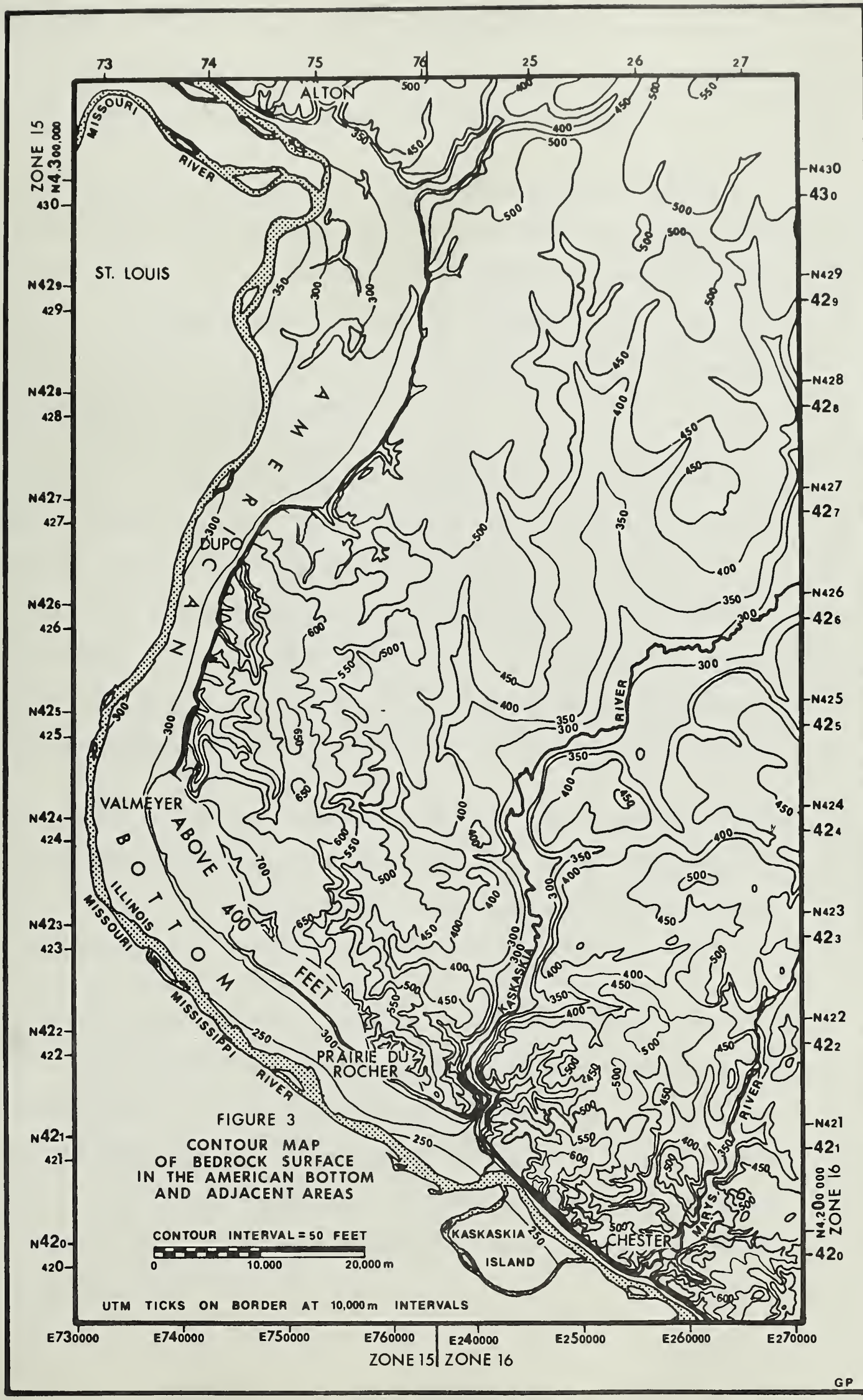


FIGURE 3

CONTOUR MAP OF BEDROCK SURFACE IN THE AMERICAN BOTTOM AND ADJACENT AREAS

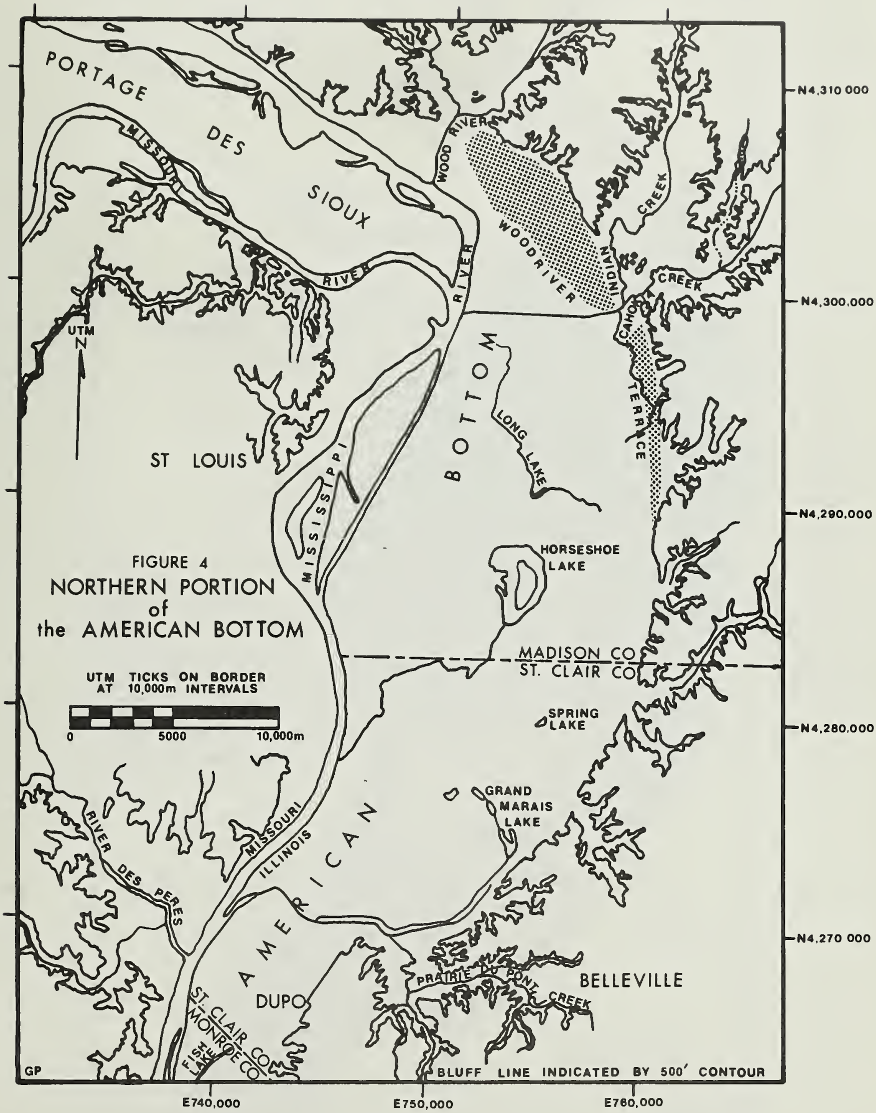
often specifically refers to the northern floodplain situated approximately between the cities of Alton and Dupo. This area extends nearly 30 miles north to south and 11 miles east to west at its maximum extent (Fig. 4).

The topography of the Mississippi River floodplain between Alton and Chester is relatively level to gently undulating, but it contains some complex geomorphological features. It is primarily characterized by modern river and stream meanders, old meander scars and banks, oxbow lakes, sloughs, marshes, natural levees, terraces, sand bars, and alluvial and colluvial outwash slopes extending out from the adjacent bluffs.

Some areas of the floodplain have been extensively studied and sub-divided into specific landform regions. For example, in the area between the Cahokia Diversion Canal, north of Long Lake, and the Prairie du Pont Floodway just southwest of the State Park Lakes area, seven distinct landform units have been distinguished. They include: a terrace region; a ridge and swale region; the East St. Louis rise; a lake region; a bluff meander belt; an alluvial fan region; and an aggraded cut and fill region (Fig. 5) (SIMARPC 1975: 22-27).

Further north, in the area between Alton and the Cahokia Diversion Canal, only four landform units have been defined. These include: a terrace region (Wood River, Festus); a bluff meander belt; a ridge and swale region; and an aggraded cut and fill region (Yarbrough 1974c: 17-26; SIMARPC 1976c: 28-34).

The floodplain south of Dupo to Chester, has not been studied quite so extensively. It is probably best characterized as a ridge and swale zone, but it contains numerous other physiographic units. For example, just north of Valmeyer lies Moredock Lake, an elongated narrow river bottom lake of natural origin (Fig. 6). It is the largest lake within Monroe County. The lake banks around this body of water are quite distinctive and were a focus of settlement during prehistoric times.



PORTAGE DES SIOUX
MISSOURI RIVER
WOOD RIVER
RIVER
WOODRIVER
INDIAN CREEK
CANOTEAU TERRACE
CREEK
UTM N
ST LOUIS
BOTTOM
LONG LAKE
MISSISSIPPI
HORSESHOE LAKE
FIGURE 4
NORTHERN PORTION of the AMERICAN BOTTOM
UTM TICKS ON BORDER AT 10,000m INTERVALS
0
5000
10,000m
MADISON CO
ST. CLAIR CO
SPRING LAKE
GRAND MARAIS LAKE
RIVER DES PERES
MISSOURI
ILLINOIS
AMERICAN
DUPO
PRAIRIE DU PONT CREEK
BELLEVILLE
ST. CLAIR CO
MONROE CO
FISH LAKE
GP
BLUFF LINE INDICATED BY 500′ CONTOUR
N4,310 000
N4,300,000
N4,290,000
N4,280,000
N4,270 000
E740,000
E750,000
E760,000

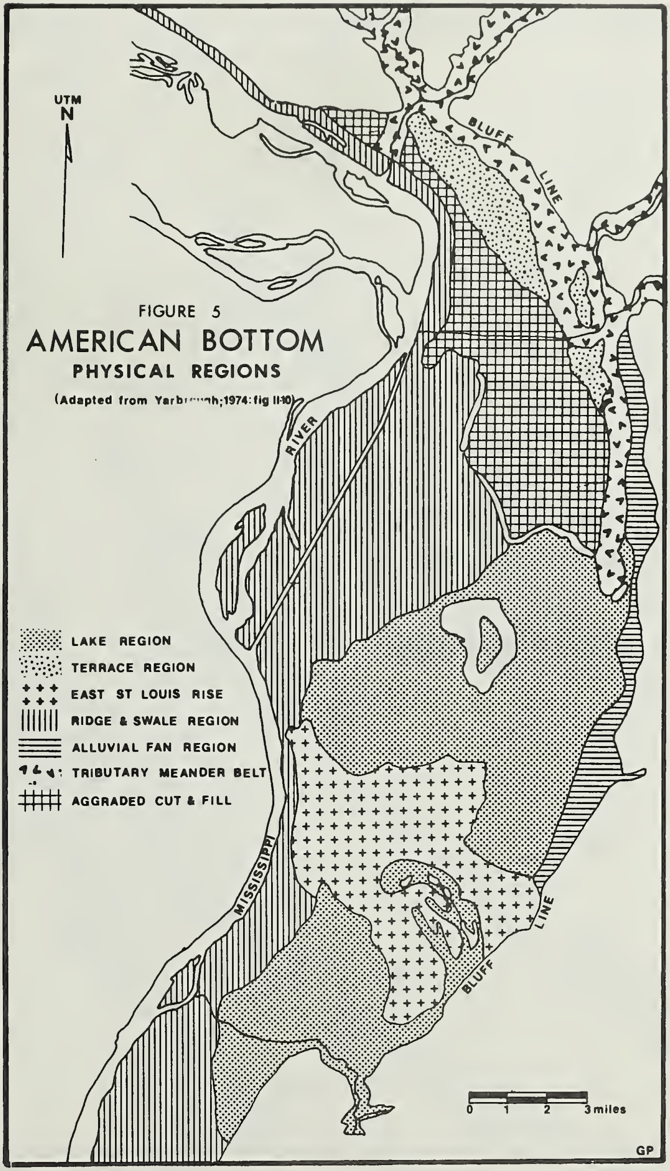
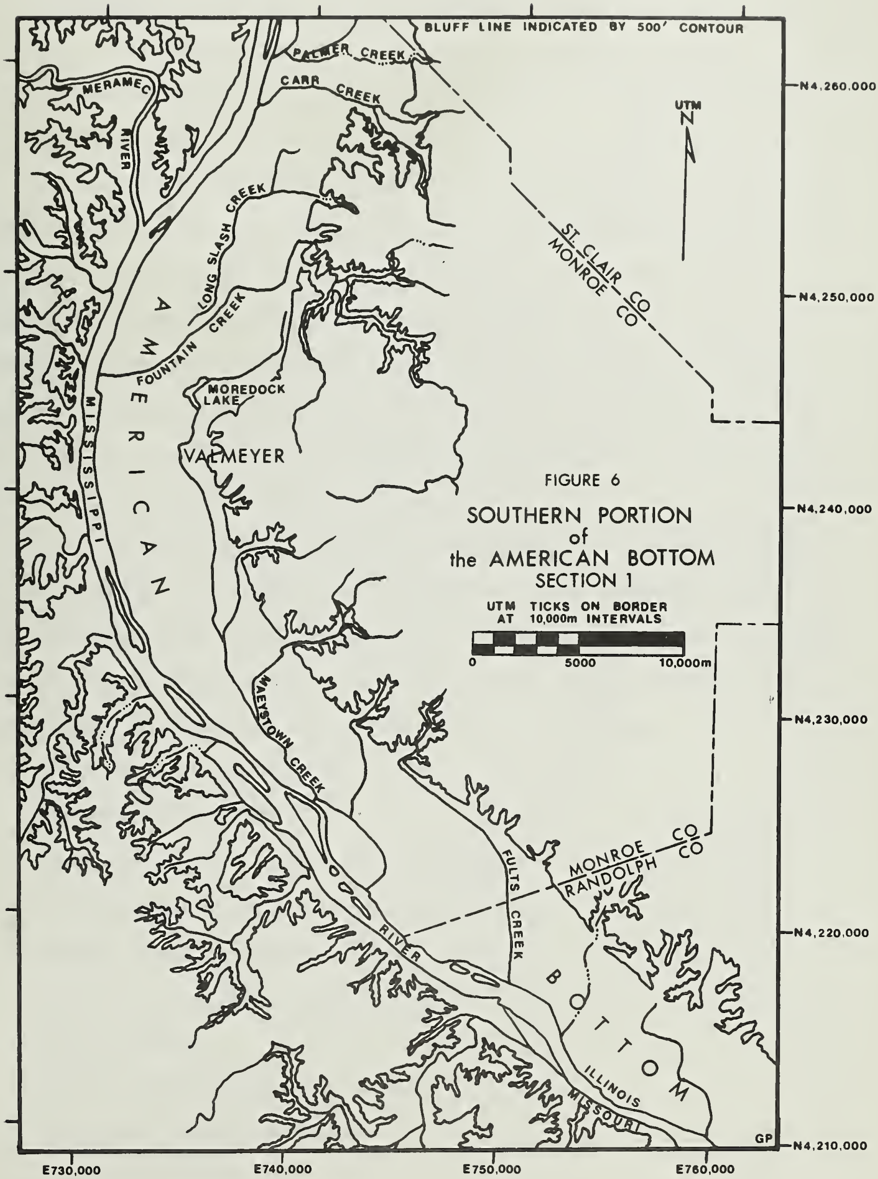


FIGURE 5
AMERICAN BOTTOM
PHYSICAL REGIONS
(Adapted from Yarbrough;1974: fig II-10)


BLUFF LINE INDICATED BY 500' CONTOUR
PALMER CREEK
CARR CREEK
MERAMEC RIVER
UTM N
LONG SLASH CREEK
ST. CLAIR CO
MONROE CO
A M E R I C A N
FOUNTAIN CREEK
MOREDOCK LAKE
VALMEYER
MISSISSIPPI
FIGURE 6
SOUTHERN PORTION of the AMERICAN BOTTOM
SECTION 1
UTM TICKS ON BORDER AT 10,000m INTERVALS
0
5000
10,000m
MAEYSTOWN CREEK
FULTS CREEK
MONROE CO
RANDOLPH CO
RIVER
B O T T O M
ILLINOIS
MISSOURI
GP
N4,260,000
N4,250,000
N4,240,000
N4,230,000
N4,220,000
N4,210,000
E730,000
E740,000
E750,000
E760,000

The floodplain broadens considerably near the point where the Kakaskia River enters the Mississippi River floodplain. After this point, however, except for Kaskaskia Island, the floodplain narrows as the river passes below Chester (Fig. 7). Between Chester and Rockwood the floodplain consists of only a very narrow strip of land. The Kaskaskia Island floodplain has often been flooded during the past century (SIMARPC 1977: 11). At one time this island was connected to the Illinois Bluffs below Chester; however, on April 20, 1881 the Mississippi River suddenly changed its course, cutting through the floodplain near the base of the Illinois Bluffs. This created the present Kaskaskia Island feature (McDonough and Co. 1883: 75).

Relative stability of the Mississippi River during certain periods may have been a key factor determining the high density of sites in this zone. Bareis (1964) has already carefully emphasized this point for the area in and around the Cahokia Site complex (also Munson 1974).

At a more specific level the following topographic units were recognized. These units represent the basis of the topographic factors utilized in the physiographic tabulations presented in Section IV. Twenty-three units containing archaeological sites were distinguished, some of which actually represent combinations of physiographic features. These units are as follows:

--- old channel or meander banks

--- colluvial outwash fans

--- level areas with no recognizable topography

--- isolated rises or ridges of undefined origins

--- multiple ridge and swale units

--- ridges within colluvial outwash areas

--- natural levees

--- creek or stream terraces or banks

--- modern lake banks or terraces

--- Mississippi River bank

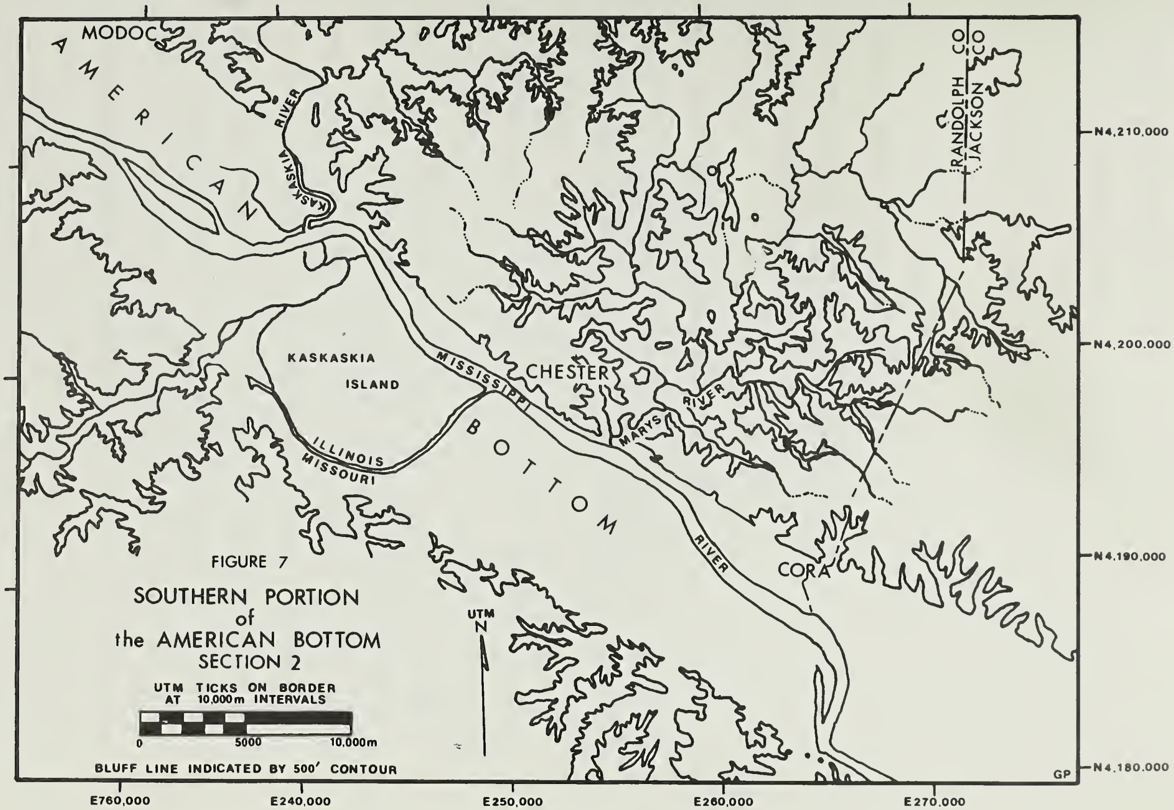


FIGURE 7

SOUTHERN PORTION
of
the AMERICAN BOTTOM
SECTION 2

--- ancient lake banks or terraces

--- modern slough edges

--- alluvial creek outwash units

--- base of old channel scars

--- modern lake terraces and old channel banks

--- old slough banks and modern lake terraces

--- extinct slough edges

--- uncontoured rise and swale zones

--- swale or inter-ridge depressions

--- small rises or ridges within a channel depression

--- colluvial outwash creek terraces

--- bluff base

--- low swampy areas or modern backswamp deposits

Although many of these units may be grouped, they are kept separate because individual surveys have recognized these as distinct units on the official survey forms.

In terms of soils, the Mississippi River floodplain consists of silts, clays, and sands, usually in combinations. The silts and clays of the floodplain are generally derived from loess outwash and glacial till deposits from upstream. Most of these silts have been deposited during periods of flooding "with the greatest thicknesses in old river channels, lakes, and sloughs" (Yarbrough 1974a: II-4). In addition, a portion of the surface alluvium has been deposited by tributary streams draining the floodplain from the east. Sands occur in a number of regions and are found in combination with silt or clay in most areas. These sands are derived from a number of sources, including glacial sands presently buried under recently deposited alluvial soils, degraded sandstone outwashes, river sands deposited by the Mississippi River, and more rarely, glacial Illinoian till sands washing out from the adjacent bluffs.

Soil associations or specific soil series have not been utilized because of antiquated soil maps in certain counties of the study area. In these cases, it proved an impossible task to correlate the soil terminology of 1906 with the soil association names recently devised for other counties of this region.

The following soil texture units have been recognized by field archaeologists for archaeological sites and represent only the surficial aspects of soil in this region.

--- silty clay
--- silt
--- sand
--- clay (gumbo)
--- silt loam
--- sandy silt
--- silty sand
--- silty clay loam
--- clayey silt
--- sandy silt loam
--- sandy loam
--- clay silt loam
--- loess

Most of the soils mentioned on the archaeological survey forms are described by "feel" alone and are therefore, suspect; also, many texture categories could or should be combined. In consideration of the incomplete nature of soil surveys for this area, however, the above mentioned categories have been maintained.

Availability of water must be considered as one of the key factors of settlement location in this region or any other region of the world. The Mississippi River floodplain contains an abundance and variety of water resources. Many of these overlap so that it is often impossible to determine with certainty the relationship of a particular site location to a specific water resource. In all probability, a combination of several of the various water resources was utilized simultaneously.

The most common water sources in this zone include streams, creeks, sloughs, oxbow lakes, marshes, natural springs, and of course, the Mississippi River itself. The northern section of the American Bottom contains the greatest

diversity of water resources. In this area, lakes, major creeks, and oxbow arms are very common. Since several of the larger sites in the floodplain occur in this region, these latter resources were probably a significant settlement factor.

Site placement in the alluvial floodplain does not seem to be related to any one particular water source or aquatic habitat. Therefore, although water sources were of primary consideration for settlement placement, it is difficult to factor out any one source as the significant variable. Perhaps more time-specific studies will eventually enable us to refine this view.

2. Mississippi River Bluffs and Uplands

This zone most closely coincides with the Ozark and Middle Mississippi Border Divisions previously described. It includes all of the uplands and bluff zones adjacent to the Mississippi floodplain. It also includes all stream and creek valleys which drain directly into the Mississippi River, including the Piasa Creek, Wood River, Indian Creek, and Cahokia Creek upland drainage networks (SIMARPC 1976c). Creeks and stream networks draining into the Kaskaskia River are excluded from this zone.

The Mississippi River bluff zone contains a number of diverse physiographic units, ranging from vertical bluff escarpments to gently rolling uplands. It is particularly marked by rugged, dissected ravine and creek hollow topography, especially in areas adjacent to the Mississippi floodplain. Sections of upland in St. Clair and Monroe Counties also contain sinkhole or karst topography.

This zone has been very poorly surveyed in the past, Early Historic Site Surveys covered portions of this zone but generally restricted coverage to areas one mile or less from the Mississippi floodplain. Most of the sites known, therefore, occur along the western edge of the uplands, particularly along the bluff edge. Recently, however, Illinois Department of Transportation (IDOT) surveys have indicated that many portions of the upland zone contain a

large number of archaeological resources. A predictive model for site placement in this area, however, is probably premature given the restricted nature of the present site data.

Landform types are generally difficult to describe because of the rugged nature of the topography and erosional factors which have modified certain slope or ridge top features. Some of these units are locational rather than topographical. For example, the distinction between bluff edge ridge tops or lobes and interior upland ridge tops or lobes, is one of location, not type. The former is defined by its proximity to the floodplain, i.e., within 1,000 meters of the bluff escarpment. Other units, particularly along slopes or in ravines, have diffuse boundaries and, in fact, often overlap with other units. For example, ravine slopes within 1,000 meters of the bluff edge, are regarded here as distinct from ridge top edge sites. In short, the criteria used for topographic recognition in this study is somewhat arbitrary and not necessarily defined by clear natural boundaries or attributes. It is also based on the identification of physiographic units observed in the survey records. The following topographic units are recognized in this study.

--- bluff ridge tops or lobes more than 1,000 meters from the bluff edge

--- bluff ridge tops or lobes less than 1,000 meters from bluff edge

--- creek terraces within bluff ravines, hollows or creek floodplains

--- undulating dissected uplands

--- bluff or upland ravine or hollow slopes

--- colluvial bluff terraces, bordering the Mississippi River floodplain

--- vertical bluff or rock face outcrops (e.g. rockshelters, petroglyph sites)

--- sloping bluff or upland lobes, extending off of ridge tops

--- sloping bluff lobes, extending into creek floodplains

--- colluvial fans within interior bluff hollows or ravines

--- bluff creek or ravine beds

--- erosional depressions on bluff ravine or upland slopes

Some sites in this zone occur on physiographic units which are clearly the result of slope or stream erosion. For example, some sites originally located on ridge tops have eroded down onto steeper ravine slopes. Site materials have also been uncovered on the rocky beds of intermittent ravine creeks in this zone, again suggesting that erosion or stream wash plays a role in re-positioning materials on certain types of terrain.

Soil distinctions in this zone are difficult to assess from the archaeological records. While soil scientists observe several important distinct soil associations and soil types in this zone, archaeologists have generally referred to all these as loess. This nomenclature is also utilized for the majority of site locations in the Kaskaskia drainage network. Early soil studies of St. Clair County (Smith and Smith 1938), for example, distinguish 30 soil varieties, including 28 silt loam types, one clay type, and one sandy loam variety. More recent studies in Madison County (SIMARPC 1970) have distinguished thirteen distinct soil associations and 26 soil series designations. Some of these associations overlap with floodplain associations. In terms of texture distinctions, however, silt loam types still are recognized as the predominant soil unit in this zone, with clay and sandy loams occurring less frequently. Early soil maps for Monroe County essentially recognized the same proportions of upland soil types. In Randolph County, sandy silt loams are more common, especially along the edge of the bluffs.

Most of the soils in the Mississippi River uplands and bluff zone have, in fact, been built upon loess deposited during former periods of glaciation. The depth of this loess cover varies considerably within the upland zone. Some of these deposits attain thicknesses of up to 50 feet in the bluffs adjacent to the floodplain. Deposits gradually decline in thickness as one moves eastward (Yarbrough 1974a: II-3).

Loess deposits represent the parent material on which soil has developed in the upland zone. Many archaeologists, however,

make no distinction between parent material deposition and surface soil development. Archaeologically, this distinction may or may not be significant, but the failure to recognize this fact has resulted in a dichotomy between those who prefer to label all soils in this zone as loess and those who recognize distinctions in the surficial soils developed over the loess deposits.

Generally, soil nomenclature in this study has strictly followed the soil texture identifications made by field archaeologists surveying this zone. The following soil texture types have been recognized by archaeologists in the field.

--- loess
--- silt
--- silty clay
--- sand
--- clay
--- silt loam
--- sandy silt
--- sandy loess
--- clayey loess
--- silty clay loess
--- clayey silt
--- clay loam
--- silty clay loam
--- sandy clay
--- silty sand

The repetition of certain soil texture groups recognized in this study is obviously the result of individual surveyor's soil nomenclature preferences and cannot be controlled for here. No attempt has been made in this research to distinguish general soil descriptions, such as loess, from more specific units, such as silty clay loam or clayey silt. This places a severe limitation on our ability to use soils as a factor of site location in the upland zone. Moreover, the notable lack of modern soil surveys and terminology in St. Clair, Monroe and Randolph Counties, prohibits the use of more recently defined soil associations in other counties for possible site-soil correlations within the resource zone as a whole.

The water resources of this zone are restricted to permanent streams, sinkholes, natural springs and secondary intermittent creeks. Unlike the floodplain, sites in this zone seem to be located more frequently near one particular water resource, and especially near permanent flowing streams.

Bluff streams contrast strongly with the sluggish, winding streams and creeks of the floodplain. Bluff streams are characterized by frequent seasonal flooding and severe erosion. For this reason, sites are not commonly found in the confines of narrow creek ravines or near the edges of streams in defined bluff floodplains.

The complexity and size of streams is generally greater in the northern sector of the bluff zone, especially in Madison County. The floodplains of Cahokia, Piasa and Indian Creeks and Wood River are prominent features of the northern bluff area. These floodplains contrast with the smaller creeks of the uplands within Monroe, St. Clair and Randolph Counties.

3. Kaskaskia River Floodplain

The Kaskaskia River is "the second largest stream located entirely within the state of Illinois" (Yarbrough 1974b: 1). It runs generally in a south-westerly direction originating near Champaign, Illinois and emptying into the Mississippi River about 10 miles north of Chester, Illinois. The river is nearly 310 miles long, and its drainage basin,which covers about 5,840 square miles, averages about 33 miles in width.

The Kaskaskia River floodplain and river cross through four of the natural divisions of Illinois discussed previously, including the Mississippi River floodplain, its adjacent uplands, the Mt. Vernon Hill Country and the Spring-field Plain (which is sub-divided here into the Effingham Plain and Grand Prairie sections). The floodplain of the Kaskaskia contrasts with the Mississ-ippi River floodplain in general appearance in that the Kaskaskia River tends to lack distinctive bluffs except in the very lower end. The floodplain

is considerably narrower in width than the Mississippi River floodplain. The Kaskaskia floodplain, for example, reaches a width of only two miles between Fayetteville and Baldwin. South of this area the floodplain narrows into an even smaller corridor until it empties into the Mississippi River floodplain. In contrast, the Mississippi River floodplain varies in width from 9 miles at the Madison-St. Clair County border to 3-4 miles wide, south of Dupo (Yarbrough 1974b: 39).

The Kaskaskia River was formed sometime prior to the Pleistocene when it cut into the existing bedrock of the Springfield Plain. During the Illinoian glacial stage the valleys formed by the Kaskaskia and its tributaries were also buried by glacial drift. However, when the Illinoian glacial sheet withdrew, the Kaskaskia River returned to its original course, cutting through the glacial drift deposited during the Illinoian episode. The river was again trapped under ice during the Wisconsin episode.

During the final Wisconsin stage of glaciation, which did not cover the Kaskaskia River south of the Shelbyville Moraine system, loess was deposited throughout most of this region. In addition, glacial outwash in the form of gravels, sands, silts, and clays were also deposited in the Kaskaskia and Mississippi Rivers. This covered the previously deposited Illinoian glacial tills. Apparently, during the Wisconsin stage of glaciation, the Mississippi River silted in at a more rapid rate than the Kaskaskia River, creating a backed-up glacial lake along the Kaskaskia River which probably extended from the northern border of Randolph County to Clinton County to the north. Kaskaskia Lake seems to have covered much of Eastern St. Clair County and Central Washington County, as lacustrine sediments have been located in this area between the Illinoian glacial tills and the Wisconsin age loess deposits (Yarbrough 1974b: 25-26).

Loess deposits in the Kaskaskia floodplain are considerably thinner than

those along the Mississippi River bluff zone. Three distinct alluvial units have been observed in the Kaskaskia floodplain, including: the Equality Formation of Wisconsin Age; the Mackinaw Member of the Henry Formation of Wisconsin Age;and the Cahokia alluvium of Wisconsin and Holocene ages (Willman and Frye 1970). The most dominant unit is the Cahokia alluvium, which consists of silts, clays, and interbedded sand levees (Willman and Frye 1970: 75).

About 7,000 years ago the last loess deposits were laid down, and the major rivers and streams of this drainage began to follow their present courses. Lake Kaskaskia was drained,and many areas of the uplands were dissected by streams for the first time. "The modern floodplains were created and the older, higher floodplains were either removed by lateral migrations of the rivers or left as erosional remnants or 'second bottoms'" (Yarbrough 1974b: 29). The Kaskaskia River has eroded away much of the glacial fill in the floodplain,but the river is still 50 to 150 feet higher than the old pre-Pleistocene bedrock valleys (Yarbrough 1974b: 39). Frequent flooding of streams and rivers since the beginning of the Holocene has resulted in the burial of the original glacial sands and gravels of the Kaskaskia floodplain. The Cahokia alluvium is now the base on which bottomland soils have been developing.

As previously mentioned, only the lower reaches of the Kaskaskia contain actual bluff escarpments. In most areas,the Kaskaskia floodplain merely merges with the drift covered upland zone. This upland edge area is represented by a series of upper terraces and lacustrine deposit terraces formed during the last two glacial episodes. To distinguish between floodplain and upland zones in these areas is difficult. For example, on many site forms for the middle and upper reaches of the Kaskaskia, the older upper terrace zones are often labeled as upland edge units. Moreover, many surveyors have arbitrarily chosen

a specific contour line to demarcate upland from floodplain areas. Since this contour line obviously varies from region to region and from surveyor to surveyor, the use of these records for identifying and defining topographic regional factors is severely limited. The Kaskaskia River floodplain contains a number of distinct topographic or landform features. Generally, these features become more diverse in the lower and middle courses of the river. In the wider alluvial plains,meander scars and oxbow lake features are very common. In the upper Kaskaskia, the floodplain is marked only by the present stream, while oxbows and distinct terrace units are rare.

The following units have been recognized in this study in association with archaeological sites in the floodplain of the Kaskaskia River:

--- old meander scars

--- bank edges of the Kaskaskia River

--- level first terraces back from the bank edge of the Kaskaskia River

--- upper terraces, adjacent to the uplands

--- small creek terraces or banks within the Kaskaskia River floodplain

--- edges of ancient sloughs

--- old oxbow or lake banks

--- modern oxbow or lake banks

--- level non-terrace areas

--- multiple sand knolls or rises within the Kaskaskia River floodplain

--- bluff bases

--- backswamp deposit zones

--- bluff lobe extensions and upper terrace localities

--- isolated or solitary rises on ridges within lower terraces of floodplain

Generally, bluff or upland lobe extensions into the floodplain have been treated as upland units, except in cases where the elevations of such extensions coincide with the upper or lower terrace zones of the floodplain. A distinction

between channel bank edges and natural levees of the Kaskaskia River has not been made here, since this distinction apparently was not recognized in the field and/or on the final survey forms of individuals working in this area.

Topographic units within the Kaskaskia River floodplain have not been well-defined in the archaeological literature except in general terms. Units such as the first and upper terraces, oxbow lakes, meander scars and point bar areas have been recognized in some surveys. This study subdivided more general units such as the first terrace into level or ridge units. Ridges within this terrace zone are further subdivided into multiple ridge zones and solitary rise or ridge units. Most of these ridge units could simply be defined as channel scar remnants with greater or lesser degrees of filling; however, a distinction is made between such terrace units as such a distinction has been recognized on the archaeological survey forms.

Most of the soil units within the Kaskaskia River floodplain are the result of alluvial processes and are, therefore, rather uniformly distributed throughout this zone. Nevertheless, soil associations vary from one region to another. Two major soil associations have been recognized in the Kaskaskia River floodplain. The first, referred to as the Okaw-Colp-Wagner-Venedy Association, is found on the terraces (so-called second bottoms) of the Kaskaskia River in Monroe, St. Clair, and Clinton Counties. The second group is known as the Darwin-Lawson-Wakeland-Belknap-Bonnie Association and is found in the bottomlands of all areas of the Kaskaskia River.

The most frequent soil group of the floodplain is Bonnie, a dark greyish brown silt-loam. This soil consists of fine-silty sediments deposited in slack waters or backswamp areas. These soils are frequently inundated and are often located in level to depressional areas.

The Okaw-Colp-Wagner-Venedy Association is generally located between the

Hosmer-Stoy-Hickory Association along the upland edge and the Darwin-Lawson-Wakeland-Belknap-Bonnie Association of the bottomlands. It is frequently subject to flooding and erosion because of upland run-off, and is therefore, not usually suitable for agricultural utilization (Yarbrough 1974b: 49). Most of the soils in this association consist of fine silts, but sandy silts are also present.

Sandy soils are rare in the floodplain but do occur in certain areas. Sand ridges, for example, although generally infrequent in the Kaskaskia River floodplain zone, are commonly present in the Carlyle Reservoir area and in other sectors of the Northern or upper Kaskaskia River valley. Many of these sand ridges or knolls are probably remnants of Pleistocene river beach terraces which were created by outwash flooding during the Illinoian and Wisconsin glacial stages. These ridges are archaeologically significant in that they often occur at elevations above the more frequently inundated bottomland zone, and sites are commonly found on these units.

While soil data now exists for much of the Kaskaskia floodplain, other areas are still poorly known. Moreover, soil data is particularly poor or non-existent on the survey forms of early archaeological studies in this area. Some early surveys merely distinguish silt from sand while many forms fail to even record soil types. For example, nearly 60% of the known sites in the Kaskaskia River floodplain have no soil information recorded in the permanent records.

The key water resource of this zone is the Kaskaskia River itself. The meandering of this river, however, has created a number of other resources of equivalent importance. For example, the central and southern sections of the Kaskaskia River are marked by numerous oxbow lakes or channels and low marshy areas. Historically, we know that portions of the river contained many more of these areas than now exist. Flood control measures have drained a

number of these areas only during the past two decades.

Much of the bottomland and first terrace zones of the Kaskaskia River Valley may have been unavailable for aboriginal settlement because of flooding and drainage problems. For this reason, many archaeological surveys have tended to concentrate on the upland edges of the river valley. As a result, there are now more sites known in this area than in the floodplain.

There also exists in the Kaskaskia River Valley a large number of confluence areas. These zones are defined here as land areas where a tributary creek or stream joins the main river. A number of large sites have been recorded in such areas and may have served as control points or gateway communities (cf. Hirth 1978) monitering access to the tributary valley floodplains entering the Kaskaskia. In terms of exploiting such areas for natural resources, however, it is not necessary to actually occupy such zones for long periods or live in the precise area of exploitation. Upland zones above these areas are actually more suitable for the exploitation of a wide variety of resources. In fact, more sites occur in the Kaskaskia River valley <u>above</u> river confluences than in close proximity to these confluences on the floodplain. This fact probably best supports the idea that floodplain sites in such zones may have functioned as control or gateway sites rather than as subsistence exploitative centers.

4. Kaskaskia River Bluffs and Adjacent Uplands

The formation of bluff and dissected uplands adjacent to the Kaskaskia River was the result of river cutting during the Pleistocene interglacial periods and recent epochs. The depth of these cuts is dependent on the existing bed-rock formations and the degree of sedimentary filling in the river valley. The narrow floodplain and higher bluffs of the lower sectors of this river valley are the result of "harder Mississippian Age carbonates which have not allowed the river to cut laterally as readily as the softer Pennsylvanian Age materials

upstream" (Yarbrough 1974b: 39). In these upstream areas the floodplain of the Kaskaskia River merges gradually with the dissected uplands of the Springfield Plain.

Another distinct bluff area in the Kaskaskia River Valley is located around Vandalia in southwestern Fayette County. This zone consists of uneroded morainal topography, and in the uplands is characterized by kame and kettle features. For approximately six miles the river has cut through this zone and created steep bluff escarpments along the west side of the river.

Most of the adjacent uplands are rather low in elevation, averaging only about 30 feet above the present valley floodplain. The slopes, except in the few bluff escarpment areas, are generally rounded and smooth with some evidence of gullying. A peculiar feature of the valley bluff zone is the absence of bedrock exposures along its entire valley course. For this reason, aboriginal rockshelter habitations are unknown in this area. This contrasts strongly with the situation present in the bluff zones of the Mississippi and Illinois Rivers.

The Kaskaskia River bluffs are defined as that area of upland topography which lies directly adjacent to (within 1,000 meters of) the Kaskaskia River Valley. The following topographic features have been recognized in this area:

--- bluff edges, steep profiles

--- edges of dissected uplands, gradual profiles

--- distinct upland lobe extensions into floodplain

--- rolling morainal ridges, back from bluff edges

--- small gully ravines running into floodplains

--- upland slopes merging into floodplains

In the archaeological records, most of these units are merely referred to as the upland edge and are not further subdivided. Since this tends to gloss over the topographic diversity existing in this zone, the above distinctions have

been maintained in this study.

Generally, bluff and upland soils in this area have been formed under woodland conditions. Topography, slope, and drainage, however, have resulted in the formation of at least four soil associations. These include: Hosmer-Stoy-Hickory; Bluford-Ava-Wynoose-Blair; Cisne-Hoyleton-Huey;and Alford-Muren-Iva. The latter soil association occurs only in the last ten miles of the Kaskaskia River (Kuttruff 1974: 20).

Unfortunately, about 80-90% of the archaeological site forms for this area contain no information on soils. Soil texture classes, when recorded, include silt, silt loam, sandy silt, loess, and silty clay. Most of these soils have developed over loess and Illinoian glacial till.

Water resources in the upland edge zone are generally restricted to streams and small creeks. However, areas of uneroded morainal topography, sinkholes or water-traps, have been formed along the bluff edge. These sinkhole lakes and ponds would have provided an additional source of water for aboriginal populations although given the presence of the nearby river and numerous running creeks, such areas would perhaps not have been preferred for extended periods of time.

5. Kaskaskia Tributary Floodplains and Adjacent Uplands

This zone actually comprises two separate study units in this project, discussed here as one unit. It includes the major tributary valleys of the Kaskaskia River and their adjacent uplands. A number of Historic Site Surveys have been conducted in some of these tributary valleys and constitute the present focus. These valleys include the Silver, Richland and Shoal Creek drainages. Some of these valleys have received more interest in recent years than portions of the Kaskaskia itself. As a result, the number of sites known in these valleys is now nearly equivalent to the sites recorded along the entire extent of the

Kaskaskia River (Table 3).

Most of the tributary valleys mentioned above cut through the Springfield Plain in a southerly or easterly direction. The floodplains are often wide, and the surrounding uplands are often not topographically distinct from the floodplain valleys.

The Richland Creek basin lies in St. Clair, Monroe, and Randolph Counties, and is about 28 miles long, 9 miles wide, and comprises an area of approximately 243 square miles (SIMARPC 1976b: 6). The Richland Creek drainage cuts through Illinoian drift deposits of the so-called Glasford and Pearl formations. A great deal of regional variation, however, exists in glacial till composition in this drainage network. Along the upland ridges of the Richland Creek basin this drift consists of gravelly till, poorly-sorted gravel, well-sorted gravel, sand, silt and clay. Outwash sand and gravel deposits, known as the Pearl formation, occur extensively on the surface, particularly in the central part of the basin (SIMARPC 1976b: 23).

Interglacial clays of Sangamon Age overlie much of the Illinoian drift in the uplands, and these clays in turn are overlain by Wisconsonian loess. Loess deposits are generally shallow in the basin uplands, thinning to less than 10 feet in the southern end of the basin. Modern soils have developed over the loess. At the southern end of the basin, about 10 to 20 feet above the floodplain, modern soils overlie silty and clayey lacustrine sediments, formed during the Wisconsin glacial episode.

In the floodplain, recent deposits consist of Cahokia alluvium and contain no loess cover. Recent soils have developed over this alluvium, which consists primarily of fine silts and clay.

There are ten recognized soil associations in the Richland Creek drainage that generally coincide with the landform divisions of upland, terrace, and alluvial plain found in this basin. The alluvial plain or bottomland consists

of only one soil association, known as Wakeland-Bonnie. These are primarily silty riverine soils, most of which are poorly drained and susceptible to flooding.

The other nine associations, including Darmstadt-Piasa, Fayette, Muscatine-Tama, Herrick-Uirden, Iva-Alford, Alford, Alford Korst, Okaw-Hurst, and various Orthents (over strip mine terrain) occur along the slopes and ridge tops of the uplands around the Richland Creek basin. Soils generally have higher clay contents than in the floodplain and are subject to upland run-off erosion.

Water resources in this area consist of the Richland Creek itself and its tributaries, and various sinkhole ponds in the western portion of the basin. Flooding is an important factor in the floodplains of this basin. Ten major floods have been recorded in this basin between 1908 and 1957 (SIMARPC 1976b:11). Recent soil conservation and land use measures have minimized flooding in this area, but in terms of aboriginal concerns, settlement in the floodplain would have been affected by this physiographic factor.

The Silver Creek drainage basin is a complex zone, resembling in some respects, the characteristics of the Kaskaskia River floodplain and uplands. The basin lies within Madison and St. Clair Counties although its headwaters originate near Mount Olive in Macoupin County. Silver Creek runs about 61 miles from this point to the Kaskaskia River, near New Athens in St. Clair County. The basin consists of approximately 495 square miles, but Silver Creek itself accounts for only 5,800 acres of this drainage area (SIMARPC 1976a: 6). The Silver Creek floodplain is only about 1 mile wide in most places, but it includes such features as swamps, oxbow lakes, and pronounced river terraces. The floodplain is also drained by several major tributaries, including East Fork, Ogles, Mill, Loop, and Sugar Creeks.

Geologically, the area does not differ significantly from the Richland

Creek basin just described. In the uplands, loess deposits vary from 5 to 30 feet in thickness, gradually thinning in the southern portion of the basin. Drift and bedrock exposures are found along the East Fork of Silver Creek. Uplands gradually merge with the floodplain of this basin.

Topographically, the area has been described as follows: " 1) nearly level to undulating areas, which account for the largest portion of the basin, occupy the eastern and northern sections; 2) rolling areas, associated with the morainal ridges, are found east of Silver Creek in the central and southern portions of the basin; and 3) the undulating to rolling area associated with the alluvial valley of Silver Creek with the dissected uplands adjacent to the valley" (SIMARPC 1976a: 26). Generally, topographic variation in the Silver Creek basin is minimal, although in some places gullying and ravine topography occurs, particularly in the western and eastern portions of the basin.

The floodplain of Silver Creek and its tributaries consists of Cahokia alluvium on which are formed several soil types; of these, the Wakeland-Haymound Association most commonly occurs in the floodplain with the Muren-Alford-Hickory Association present just above this on the upland edge. Floodplain soils are generally poorly drained and subject to flooding. They consist primarily of silt loams and fine alluvial silts. Upland soils of the Muren-Alford-Hickory Association vary in texture depending on parent material and slope, but generally, consist of silt loams and silty clay soils. The major limitation of these soils for agricultural purposes is steepness of slope which results generally in high surface run-offs and severe erosion.

Water resources in this basin are plentiful and include streams, creeks, rivers, marshes, oxbow lakes, and sloughs. Flooding is the main problem in this area as it is for all the tributary basins of the Kaskaskia. We would assume that flooding was also common in the past and that <u>settlement strategies were adapted to this variable</u>. Intensive surveys of this region have

shown that nearly 75% of the sites known in this and other tributary basins are found in the uplands above major floodplain areas.

Very little physiographic information is now available for other tributary valleys of the Kaskaskia River. However, many of these valleys and their adjacent uplands are similar to the Richland and Silver Creek drainages both in terms of general topography and specific soil associations. All of the valleys cut through Illinoian till, and most have some loess deposition overlying the till. Soils have developed primarily as a result of parent material type, slope, drainage, and vegetation regime. Generally, the high proportion of upland sites to floodplain sites has been consistently observed in every valley where archaeological surveys have been undertaken. In Shoal Creek, for example, the majority of sites discovered during the Historic Sites Survey of this basin, occurred along the edges of the floodplain. It is appropriate to point out that many tributary valley surveys have shown a definite bias towards upland areas, often to the exclusion of floodplain areas or some portions of the valleys surveyed (Wilson 1978 personal communication). Denser vegetation and flooding in the floodplain areas have also limited the amount of surveying possible in such areas.

Finally, it is difficult to combine all the tributary valleys into one physiographic unit. Clearly, a great deal of physiographic diversity can be recognized from one valley to the next. In this sense, further studies should treat each of the major tributaries as distinct units. In this way, models can be created for each river valley of the Kaskaskia drainage region.

6. Dissected Upland Till Plain, Within the Kaskaskia Drainage Basin

This area is defined as the upland till plain which is located more than one mile from any major stream or river floodplain valley in the Kaskaskia drainage basin. Of all the areas recognized in this study, this is perhaps the most poorly known archaeologically.

This zone consists of a number of distinct landform units formed primarily by past glacial activity in this region. Most of this area can simply be typified as a dissected till plain, but within this plain, there exist several glacial landform systems of archaeological significance. They include the Wisconsin morainal systems of the Shelbyville terminal moraine and the kettle moriane of Ridged Rift County of Illinoian age near Vandalia. Both areas contain numerous kettle depressions which "are the largest source of prairie small waters" in the upland zone (Carmichael 1977: 222). Carmichael's survey of kettle depressions in the Vandalia area and along the Shelbyville moraine suggest that these physiographic units played an important role in the settlement and exploitation of the uplands (Carmichael 1975; 1977).

The remaining area of the upland zone can be characterized as a gently rolling plain with occasional drift ridges or accumulations of either Wisconsin or Illinoian age. Other aspects of topography are the result of small intermittent creeks cutting through the surface of this till plain.

Soils in this area have been generally formed under prairie or grassland conditions. Loess cover is thin, averaging only 4 feet deep in places. The soils which have developed over this loess cover consist of various brown silt loams, or more rarely, in low areas, of clay loam. Soil surveys are mostly incomplete in this region throughout the Kaskaskia drainage basin. Soil association groups have not yet been devised for most of this zone.

Water resources in this zone are restricted to kettle depressions and minor creeks. Most water either drains off towards the Kaskaskia River Valley or is lost through sub-surface drainage. Large sites, especially from later prehistoric periods, are virtually unknown in this region. This scarcity can most likely be attributed to the general paucity of water resources within the upland till plain. The sites present seem to represent small Archaic

hunting camps. Carmichael has hypothesized that kettle localities were utilized as seasonal summer camps for the purpose of exploiting small game and plants (Carmichael 1977). The exploitation of deer along the morainal ridges of this area (deer-runs) should also be considered as a settlement or habitation factor.

7. Mississippi-Kaskaskia Bluff Confluence Zone

This zone includes only a small bluff area located near the outlet of the Kaskaskia River into the Mississippi floodplain. This area is located in the bluffs south of Ninemile Creek and west of Ellis Grove east of the Kaskaskia River. To the west it includes those bluffs and uplands located south of Crooked Creek. The western border of this zone was arbitrarily defined as the edge of the Baldwin 15' quadrangle at 90^{o} 00'.

Essentially, this zone includes the bluff area which overlooks both the Kaskaskia and Mississippi River floodplains. The fact that 35 sites have been located in this area suggests that the Kaskaskia River outlet region was an important locality, not only in the floodplain area, but in the surrounding uplands. In fact, one of the largest Mississippian sites in the area (Roots) is located at the base of this upland zone.

Further description of this zone will not be attempted here since geologically it belongs to the Mississippi bluff zone already described. This is not a natural division within the Mississippi bluffs or the Kaskaskia bluffs. It is merely an arbitrary division based on the presence of probably the most important riverine outlet area in the entire Mississippi River floodplain section of this study.

It has been demonstrated that the archaeological resource zones within the Kaskaskia River drainage basin contain diverse physiographic resources. One such resource, thus far excluded from discussion, is vegetation. The floral

regimes of these zones have undoubtedly played a significant role in the prehistoric selection of specific settlement locales. This has been pointed out by Kuttruff (1974) and Morrell (1965).

Both of these researchers have attempted to reconstruct prehistoric settlement procurement systems based on the floral environment which characterized this area in the 1830's (Kuttruff 1974: 46). The present investigation, however, does not assume that floral regimes remained stable for eight millenia throughout the entire drainage system.

On the contrary, it is here suggested that past floral communities were sensitive to changes in climate and that fluctuations in these communities must have occurred. Additional pollen studies and subsistence data from archaeological sites in this drainage basin, are clearly required in order to resolve this issue. Vegetation, therefore, has not been utilized as a physiographic factor in this study although its importance to prehistoric subsistence and settlement patterning is recognized.

III. THE NATURE OF THE DATA

The Data Base

The archaeological sites incorporated in this study are primarily derived from a records search of the Illinois Archeological Survey files in Urbana, Illinois. These files contain not only the site forms gathered by the Illinois Archaeological Survey, but also forms filed by Southern Illinois University and Illinois State Museum surveys. In addition, a large number of survey forms, undertaken under no particular sponsorship, exists in these files.

The records search at Urbana involved the examination of a large number of forms, undertaken on a county by county basis. The extraction of information was performed in conjunction with the survey file USGS quadrangle maps for each county. The majority of quadrangles in the Kaskaskia River drainage network

still consist of 15' maps while all areas of the Mississippi floodplain and uplands possess 7½' maps.

Many of the sites recorded on the 15' quadrangles in the Kaskaskia area are not precisely located. Re-check surveys have failed in many cases to relocate these sites. This is due mostly to poor locational data on the original forms, which in many cases only located sites at the section or half-section level. Much of such data has been excluded from this study.

Use has been made of a large number of still unprocessed forms, resulting from recent highway surveys in the American Bottom and adjacent uplands. These forms have been studied in conjunction with project coverage maps, which include not only site locations but also delineate the areas surveyed.

A more detailed description of the methods and sampling biases of each project will be presented in later sections. It should be noted here, however, that the use of survey records in a project such as this, involved a number of limiting factors which weaken the statistical reliability of specific factor correlations in this area. Survey forms vary at both the quantitative and qualitative levels. For example, some forms include elevation and soils; others include only elevation; and still others include only locational data. At a qualitative level, forms vary as to the interpretation of soils or topographic nomenclature within a common region. Moreover, individual surveyors have not always been internally consistent in this regard.

Only a very small portion of this study area has maps which indicate areas walked as well as showing site areas located. In our opinion, areas walked but containing no sites, are just as important to a site location model as the known sites themselves. Recent highway surveys and previous Historic Site Surveys in the Mississippi floodplain have provided this study with its only site/non-site data (Porter 1971, 1972a; Porter and Linder 1974; Linder et al. 1975).

History of Archaeological Investigations

1. The Kaskaskia Drainage Region

Archaeological survey in this zone has been intensive but sporadic over the past thirty years. Some areas, particularly along the lower Kaskaskia or along certain tributaries of the Kaskaskia, are relatively well known while other regions to the north have received little or no attention. A large number of individuals have been involved in this area over the past three decades. This, in part, is responsible for the great variation in the Illinois Archaeological Survey forms on file. Moreover, not all survey forms have been filed by archaeologists. Some forms for the northern areas were filed by local collectors; these forms usually contain very little information, and re-checks have often failed to re-locate reported sites of this kind.

Surveys of this area have ranged from "week-end excursions" to comprehensive transect surveys (Kuttruff 1974). File information, however, does not always indicate the methods employed on these surveys. Consequently, for purposes of this study, it has been necessary to regard the resultant data as essentially comparable.

The majority of archaeological sites known in the Kaskaskia River valley were located during the Carlyle Reservoir Project conducted by the Southern Illinois University Museum during the early 1960's (Binford 1962; Binford et al. 1964); the Lower Kaskaskia Canalization Project conducted by Conrad and Hutto (Conrad 1966); and the Kuttruff, Iseminger, and McNerney survey of 1970 (Iseminger and McNerney 1973) conducted under the auspices of the U.S. Department of the Interior, National Park Service.

The Iseminger, McNerney, and Kuttruff survey located a total of 183 new sites in the lower Kaskaskia area. This survey covered the lower 52 miles of the river valley which constitutes about 15% of the entire Kaskaskia River valley. Certain areas were given greater coverage than others, with emphasis being placed on areas endangered by the proposed canalization project in the floodplain

and areas of the adjacent uplands which Conrad's earlier survey had indicated would be fruitful. The majority of sites (140) recorded in this survey were located along the upland or bluff edge while the remaining sites were discovered along the floodplain terraces of the Kaskaskia River (Iseminger and McNerney 1973: 2). Some testing of endangered sites was undertaken several years later by Kuttruff (1972) at the Marty Coolidge Site and by Iseminger (1973) at the Argo Site.

The earlier survey and testing conducted by the Southern Illinois University Museum in the Carlyle Reservoir area (now under water) produced fewer sites, but explored a smaller area more intensively. However, surveyors generally sought out only the more significant or better known sites in this area. These larger sites were then excavated under salvage conditions during the 1960's. Some of the sites tested include the Texas Site (Morrell 1965); the Kerwin and Orrell Sites (Salzer 1963); the Boulder Site (Rackerby 1966); the Hatchery West Site (Binford et al. 1970); and the Gus Krebs Site (Fowler 1961).

Surveys along the middle and upper portions of the Kaskaskia River generally fall into the "week-end excursion" category. None of these areas has been systematically surveyed over a long period of time. For this reason, any settlement model for the Kaskaskia River must be regarded as strongly biased towards the lower Kaskaskia, south of the Carlyle Reservoir area.

Our information for the Kaskaskia tributary floodplains and uplands is largely the product of Historic Site Surveys undertaken in the Silver and Shoal Creek drainages during the past decade. Wilson's surveys of the Shoal Creek area have located 135 sites since 1972 while Rauh's surveys of the same period have located nearly 400 sites in both the Silver and Sugar Creek areas (Rauh 1971, 1975; Rauh and Wilson 1972, 1974).

Much of Silver Creek has been completely covered while Shoal Creek has been only partially covered.

Coverage in the Shoal Creek area has been predominantly focused on the upland edge zones (Wilson 1978 personal communication). Less attention was paid to floodplain units. Most of the survey was also centered on the lower and middle portions of the creek drainage. The headwater area has still not been thoroughly investigated. Heavy emphasis on the upland portions of this creek drainage has obviously biased much of the data in this area towards particular kinds of upland physiographic units. For this reason, predictive models for small creek drainages such as this, are still premature.

The Silver Creek survey contains a significant bias which could influence future predictive settlement models for this area. A large number of lithic scatter sites in this creek valley have been dated arbitrarily to the Archaic period. In some cases site divisions are based solely on spatial gaps in lithic scatters. The determination of what constitutes a site becomes an important sampling factor in this area. These small lithic scatters, sometimes only 30-50 meters apart, were separated, hence increasing the site sample size, of this survey. In addition, the settlement locality data has clearly been weighted toward small scatters in this area. This factor is an aspect of archaeological interpretation which adds an obvious element of subjectivity to any statistical model formulated under these conditions. Differing interpretations of what constitutes a site, make interregional correlation of small scale site-physiographic units statistically impossible.

Carmichael's (1975; 1977) recent survey of the kettle moraine country of the Kaskaskia basin uplands,is perhaps the only systematic survey to date of any upland region in the Kaskaskia drainage. Since there are presently no forms filed in Urbana for this survey, only general information presented in a recent publication can be utilized in this study.

This survey was undertaken in 1975 in two areas, known as the Ridged Drift area near Vandalia and the Shelbyville Moraine located between Decatur and Shelbyville. Only the southern portion of the Shelbyville Moraine of his study falls within the Kaskaskia drainage area defined in this project. Twenty-five sites were located in the Vandalia area and 77 altogether in his entire survey area. His preliminary results have already been discussed in a previous section.

Important here, in terms of sampling, was Carmichael's concentration on specific glacial physiographic features. In addition, the researcher's definition of a site as the presence of 10 or more artifacts (Carmichael 1977: 224) contrasts with other surveys in the Kaskaskia area which regard single artifact occurrences as sites. Lack of regional consistency in basic terminology such as this, is obviously not conducive for predictive statistical studies in this area at this time.

Carmichael's survey has indicated, however, a need for further studies of certain glacial features in the uplands of the Kaskaskia drainage. Kettle depressions of the uplands had not been previously regarded as significant settlement localities in this area. Before a truly reliable predictive model of settlement location can be devised for this area, all prominent glacial features must be thoroughly surveyed. Known non-site areas should also be recorded, a feature missing in Carmichael's survey.

2. The Mississippi River Floodplain and Adjacent Bluff-Upland Zones

Archaeological investigations in the American Bottom and adjacent bluff zones have been undertaken at least since the end of the nineteenth century (Bushnell 1922; Thomas 1894). This area has perhaps attracted more attention than any other region in Illinois. The location of Monk's Mound and its surrounding archaeological features in the northern portion of the American Bottom has led to both intensive and extensive surveys of a large portion of

this area. Surveys south of this area to the outlet of the Kaskaskia, however, were virtually non-existent until the early 1950's.

While the quality of survey investigations has generally improved over the past thirty years, large areas of unsurveyed land still exist in the American Bottom. We believe that this reflects, to a great extent, the unsystematic manner in which many past surveys have been undertaken. The often heavy emphasis on the collector interview technique of surveying has produced significant gaps in our total data base. The "big" site technique of surveying has also made it impossible, at this time, to assess the complexities of settlement systems involved. In particular, the relationship between the central Cahokia complex and its satellite communities is still poorly known, primarily because of those surveys which have only emphasized known artifactually productive sites.

After 1948, but prior to the Historic Sites Survey program, i.e. pre-1970, archaeological investigations in the American Bottom were restricted to a small number of projects undertaken under various sponsorships. The University of Michigan Museum Survey of the American Bottom undertaken by Griffin and Spaulding in 1949 and 1950, concentrating on larger or better known sites, produced some of the first recorded sites. These sites were later reported to the Illinois Archaeological Survey by Elaine Bluhm in 1957. In 1954, John C. McGregor of the University of Illinois, surveyed portions of the American Bottom and uplands in Madison County. This survey was undertaken with the aid of local collectors who directed McGregor to productive sites. These sites were some of the first to be officially recorded in the Illinois Archaeological Survey files of Madison County.

During the early 1960's several significant surveys were undertaken in this region. Among the most important of these was the Harn survey of St. Clair and Madison Counties in 1961 and 1962, which was confined to an area nearly

35 miles long and 11 miles wide. It was estimated that less than 15% of the surveyable land of this area was covered (Harn 1971: 21). Sixty new sites were recorded during this survey.

During 1961 and 1962 Porter and Harn conducted surveys for the first time in Randolph County in the vicinity of Chester. This survey, sponsored by SIU-Carbondale, recorded some of the first sites in Randolph County. Much of this survey was dictated by highway salvage considerations within the Menard Penitentary and the Rockwood area in southern Randolph County (Porter 1963).

In 1963, under the auspices of the Illinois State Museum, Patrick Munson undertook a survey of the Wood River Terrace and adjacent bluff and floodplain areas located in the far northern portion of the American Bottom region. Approximately 30% of a 30 square mile area was surveyed, and forty new sites were recorded. Several previously recorded sites were also surveyed (Munson 1971: 3). This survey is significant for the present study in that it is one of the few surveys conducted in this area which was restricted to a specific physiographic feature (i.e. the Wood River Terrace).

Much of the work performed in the 1960's was characterized by highway salvage projects in Madison and St. Clair Counties. Many institutions, including SIU-Carbondale, the University of Illinois-Urbana, and the Illinois State Museum, among others, were involved in the testing of endangered sites recorded during the surveys just mentioned. Virtually no other systematic surveys were carried out in this area until the first Historic Sites Surveys in the early 1970's. Collectors, however, continued their activities in all portions of the American Bottom throughout this period. A great deal of archaeological resource damage was incurred by these individuals as most of this material went unrecorded and unreported.

During 1971, the Historic Sites Survey program sponsored a series of

archaeological surveys in the American Bottom and its adjacent bluffs. From 1971 to 1974, Historic Sites Surveys were conducted by Porter in the floodplain and adjacent bluffs of Monroe, St. Clair and Randolph Counties (Porter 1971; 1972a; Porter and Linder 1974; Linder et al. 1975). During this period nearly 600 sites were recorded in the floodplain and bluff areas of Monroe County and nearly 300 sites in the same zones of Randolph County. Urban development restricted survey in the southern portions of St. Clair County, but a number of sites were also located in this area. Surveys in the bluff zones of these counties were restricted to areas not more than one mile from the floodplain-bluff edge.

The surveys undertaken in Monroe and Randolph Counties attempted complete ground coverage regardless of topographic features encountered in the field. The survey maps for this area have recorded both site areas and areas walked which contained no site units. They have been heavily utilized in the present project because, with the exception of recent FAI-270 surveys, they are the only records available for this study area which contain both site and non-site information.

It is estimated that a total coverage of 26.5% was achieved in the bluff and floodplain zones over a period of four years, or the equivalent of eight months of single man coverage (Linder et al. 1975: 32).
This coverage amounted to approximately 80.9 square kilometers of a total area of 305.9 square kilometers (within an area represented by ten 7½' USGS quadrangle maps).

During 1973 and 1974 an Historic Sites Survey was conducted by Denny and Anderson in a portion of the uplands of Madison and St. Clair Counties. The total area involved in this survey was nearly 170 square miles. During 1973 nearly 33% of this area was covered although only 30 new sites were recorded. The collector interview technique was heavily utilized, which along with

apparent land permission problems and poor weather conditions, may account for the low density of sites discovered (Denny and Anderson 1974: 146-147). During the following year an additional 23% of this area was surveyed and 122 new sites were located [Note: in their report of 1975 Denny and Anderson incorrectly indicate a 7% higher coverage percentage for this survey than is statistically indicated by the data, i.e. 40 square miles of 170 square miles represents 23%, not 30% coverage (Denny and Anderson 1975: 138)]. The survey of 1974 apparently abandoned the collector interview technique in favor of more complete ground coverage. Sampling biases are not explicitly stated in either report in regard to the types of physiographic units sampled.

Unrelated to the Historic Sites Surveys was a survey conducted by Keith Brandt in 1971 and 1972 in the Cahokia Site area under the auspices of the Unviersity of Wisconsin-Milwaukee program of research at Cahokia. Brandt merely revisited a number of previously recorded sites adjacent to the Cahokia Site in order to clarify the existing data already present in the Illinois Archaeological Survey files. This was apparently not a systematic survey and is, therefore, of limited use to the present project (Brandt 1972).

A number of field school excavations, U.S. Army Corps of Engineers projects, impact surveys, and archaeological testing projects have purposively not been included here since they do not contribute directly to the explicit goals of the present study although they have contributed valuable information about certain specific site physiographics in the region. Included in the subsequent section, however, is a brief description of the recent highway salvage and survey program undertaken since 1975 by the Illinois Archaeological Survey in connection with the proposed Federal Aid Interstate 270 project (FAI-270, formerly FAI-255), which is being planned by the Illinois Department of Transportation. This project, with its many alignment transects through the American Bottom, has now become a significant source of site/non-site data within this portion of the present study area.

In addition to the FAI-270 project, several more highway project alignment studies in this region have been completed since 1975. Of these, data from the FAP-413 corridor running through both the floodplain and upland regions of this area is incorporated in the present study (Linder et al. 1978).

The highway survey differs from many earlier reconnaissances in this area in that corridors through segments of the American Bottom and uplands were systematically covered. Collection procedures and site area definitions were precise. They consisted of general collections over broad areas of the corridor; areal collections within subdivided units of a general collection; areas defined arbitrarily, or by topograhic or distributional differences within a larger area; and piece-plot collections undertaken in smaller grid units imposed over the surface of a given site area. Shovel testing was also undertaken in areas of woods and pastures. These surveys are worthy of mention not only because they have produced many new site locations, but because the methods of survey are those needed in other areas with "resource management" concerns. They are also the kinds of surveys required to test the preliminary hypotheses generated by "predictive" models in this or any study area of Illinois. Such corridor surveys can be of great utility in producing the non-site data necessary for models attempting to predict where sites do not lie in relation to specific physiographic zones.

Models and Sampling Biases

Generally, models of any type serve as a preliminary means of estimating associations or patterns within unknown populations (Haggett 1965: 23). During the past twenty years, new approaches in statistical sampling have allowed archaeologists to quantify relationships between specific units of material culture in known and unknown populations. In addition, increasing attention has been focused on the methods by which sampled data is collected.

The use of statistical techniques in population estimation is now a common feature of many archaeological, geological, and geographical reports (Chorley 1972; Haggett 1965). Of critical importance for any kind of predictive model, however, is the factor of collector bias or his 'mode of field work.' "In order for a sample to be used to estimate a total population (unknown set of entities)accurately, the sample must be selected in such a manner that collector bias is controlled" (Raab 1976: 7). Clearly, if this is not done, the sample may only reflect the collector's bias and not the actual variability present within a given population.

Some of the sampling biases of surveys undertaken in this study area have already been discussed. In some cases, survey bias has been openly admitted as in the case of Carmichael's kettle depression survey in the Kaskaskia uplands. Most surveys undertaken in the present study area have not been statistically systematic (random or stratified random, etc.).

Generally, survey biases can be divided into two major groups in this area. The first we can refer to as a locational bias, e.g. surveys that are directed towards specific landform features. Munson's Wood River Terrace survey and Carmichael's kettle moraine survey are obvious examples of a bias shown toward particular landforms. Oftentimes, however, locational biases are more subtle. For example, survey of upland edges, to the exclusion of floodplains in major drainage regions,was a very common bias in the surveys conducted in some of the creek tributaries of the Kaskaskia River (Rauh and Wilson 1972). The Historic Sites Surveys conducted in Monroe and Randolph Counties were restricted to floodplain areas and areas within one mile of the bluffs.

A general trend in survey bias for the entire study area has been the concentration on floodplain and adjacent bluff land units to the exclusion of upland areas further away from major river valley drainages. Only a very small percentage of sites recorded in this area occur more than two miles

from major river or tributary valleys.

The second category of survey bias is referred to as interpretative. This is a major limiting factor in any attempt to construct one generalized predictive model for the entire study area. This factor concerns the definition of various physiographic or cultural variables utilized in an areal model. Generally, site forms were not consistent in the use of terms utilized in the description of physiographic units. For example, surveys for the Madison County floodplain have sometimes utilized the terms "natural levee" and "river terrace" interchangeably when clearly,each of these features is the result of different processes.

It is clear that before regional archaeological predictive models can be established in this area, there must be some standardization of terms as well as some sampling consistency in the area of data collection. The data base utilized in this study was generally deficient in this regard. The number of sites presently recorded in this area can be regarded as statistically sufficient for population estimate procedures. However, the means employed in the collection of this data have placed critical restrictions on the statistical reliability of such predictions. For this reason we would prefer to have this study considered, not as a single model capable of predicting settlement localities for an entire area, but as a series of regional evaluative models attempting to convey in general terms the nature of our settlement locality data as it exists today.

Certain regions of this study area have been more systematically surveyed than others. These areas include the Mississippi floodplain or American Bottom region and the lower Kaskaskia region. Within the Mississippi floodplain two areas contain both site and non-site information and are emphasized in this project. These include the area surveyed by the Historic Sites Survey in Monroe and Randolph Counties and the area surveyed in Madison and St. Clair Counties

under the recent FAI-270 highway project, sponsored by the Illinois Department of Transportation. The lower Kaskaskia region contains a large number of site locations but lacks surface coverage information. Areas lacking coverage information are not emphasized in this study.

The following section will present the methods and results of this study. They should be regarded in light of the previous discussion about the statistical limitations of creating such models in areas characterized by non-systematic and haphazard sampling techniques. Although models can be constructed for various purposes and at various levels of sophistication, they are useful only if new hypotheses are generated from such constructs. These models have been formulated to serve as a summary of projected needs in all areas of the Kaskaskia drainage region and as a preliminary base for generating new hypotheses to be used in future survey and testing projects.

IV. METHODS AND RESULTS

One of the primary aims of this study is to delineate the areas of highest archaeological site potential within the previously defined archaeological resource zones. Given the present data base, this can only be achieved by tabulating known site occurrences in the archaeological resource zones defined above. Areas of high site potential are merely zones on which past sampling interests have concentrated. While these areas can certainly be regarded as significant in terms of future resource management policies, one must regard the unsurveyed areas as equally significant, at least in terms of potential anthropological questions which might be posed concerning low frequency areas of habitation. For example, one large site in such an area may have more anthropological value than a dozen or even a hundred single flake sites in a so-called high potential area.

The primary method utilized in this study is the tabulation of specific site-physiographic occurrences on a zone by zone basis. Among the physiographic factors recorded on existing site forms, only topography, soils, elevation, and in some instances, nearest water source, appear useful for more complex correlations. Virtually all sites in the study area (Table 3) are located on high ground near some water resource. In many regions, creeks were the only possible source of local water near archaeological sites and due to their ubiquitous occurrence, were therefore not tabulated.

Based on the existing records, the areas of highest site potential in the Kaskaskia River floodplain are located in the following topographic units (Table 4): major terraces of the Kaskaskia River; secondary terraces of the Kaskaskia River; knolls and ridges of undetermined origin; point bars or sand accumulations; river banks of the Kaskaskia River; tributary creek terraces; and bluff bases. Sites on these units are particularly common in confluence areas, especially where tributary streams exit other floodplains or adjacent bluffs or uplands.

Along the Kaskaskia River bluffs and uplands site localities are generally restricted to fewer topographic units. Sites most often appear on the following units (Table 5): bluff lobe extensions into the floodplain; bluff edges; upland edges; and headwater areas of upland or bluff creek valleys or ravines.

Sites are very commonly found on bluff spurs overlooking stream outlets or confluence zones. They are most often found, however, on so-called upland edge units. A distinction is made here between upland and bluff edges. As previously discussed, much of the upland edge cannot be distinguished from the Kaskaskia River floodplain. In some areas, however, this edge is clearly defined by bluff heights (not escarpments). In terms of prehistoric habitation this distinction was probably not very important but it is separated here because surveys in this zone have made this distinction (Kuttruff 1969; Iseminger

et al. 1973).

In the uplands of the Kaskaskia basin, sites most frequently occur on prominent glacial features, such as kettles and morainal ridges. Since very little work has been undertaken in this uplands area, it is very difficult to suggest other kinds of localities (other than the aforementioned glacial features) which might produce archaeological resources. The present author sees no real evidence at this time for necessarily suggesting low site densities in the unsampled areas (Table 11).

Sites in the Kaskaskia tributary floodplains and bluffs are distributed on features very much like those of the Kaskaskia River area. In these tributary areas, upland edge environments are the most commonly occupied units. Within these units, it is particularly common to find sites on bluff or upland spurs overlooking stream confluence areas. Headwater areas of small streams draining into major tributaries such as Silver, Richland, and Shoal Creeks, were also preferred areas of settlement (Tables 9, 10).

Unit occurrences in the Mississippi bluff and uplands are presented in Table 6. Much of this area has not been surveyed, so the archaeological potential is difficult to assess at this time. Generally, sites seem to be most frequently located on the following topographic units: bluff top ridges back from the bluff edge; bluff top edges overlooking the Mississippi floodplain; creek hollows and headwaters of creek hollows; colluvial terraces at the base of bluffs, and particularly near stream outlets into the floodplain; gently undulating ridge areas of the uplands; bluff spurs and extensions into major streams such as Cahokia, Indian and Piasa Creeks and Wood River; rock shelter or overhang areas along vertical bluff escarpments. It is assumed that various outcrop areas would also have high potential for quarry sites. Such areas, however, have not been well-surveyed.

Site distribution potential in the Mississippi floodplain is still difficult to evaluate. There are a number of difficulties in determining potential

localities in this area. Of primary concern is the presence of buried sites in the floodplain area. Porter's AT&T survey in Monroe County (Porter 1972b; 1973) has located a site locality on the inside edge of a channel scar which had been subsequently filled. Several sites were also found under redeposited creek sediments within colluvial outwash areas extending out from the bluffs. <u>In floodplain zones, therefore, sub-surface resources are of critical importance to any resource management policy in this area.</u>

The most frequent site localities are tabulated in Table 7. Additional correlations between soil, water, elevation, and old channel banks have been presented in Table 8. A correlation between soils, elevation, and colluvial outwash units was also computed and is included in Table 8. Using these variables, the highest ranked cluster occurrence in this entire area involved only 21 sites. This amounts to slightly less than 3% of all sites known in the Mississippi floodplain. This suggests that the variables were either too specific for this kind of cluster analysis or that such clustered variables have no archaeological significance in this area. The author prefers the latter hypothesis and would suggest in this regard that more general locales, such as channel banks and stream outlets were of greater importance in prehistoric settlement location than were clusters of specific physiographic features within these more general locales.

In this regard, an attempt was made to formulate a specific predictive model for the occurrence of sites in one particular type of locale which is termed the stream outlet. This locale occurs at the edge of the floodplain and along the bluffs; stream outlet locales are defined as occurring in the immediate vicinity of stream valleys or ravines entering the floodplain. Bluff lobes immediately overlooking these stream outlet areas are also included within the locale definition.

To evaluate the preliminary hypothesis that such locales have high site

potential, all mapped USGS streams and creeks (including indicated intermittent streams) were tabulated between Cement Hollow just east of Dupo, Illinois and the first unnamed intermittent stream south of Fort Gage, several miles north of Chester, Illinois. The following chart illustrates that such outlet locales were important for prehistoric settlement in this area:

	Total No.	Unsurveyed	Partially Surveyed	Site Occurrences	Site Occurrence Ratio
Stream Outlets	43	22	21	18	.86
Surrounding Bluff Edges	43	29	14	11	.79

Site occurrences in this table refer only to the presence and absence of sites, not to specific numbers of sites. Most of these outlet areas, even where sites occur, have only been partially surveyed. However, these results suggest that for those areas not yet surveyed, we can expect an 80% chance of site occurrence in this type of physiographic locale.

It is appropriate to re-emphasize that such studies can only be undertaken when all coverage is recorded on USGS maps, a feature apparently absent from most surveys. The information presented here is on the Historic Sites Surveys conducted in this area between 1971 and 1974. Finally, such a model can easily be tested in the future by surveying the remaining outlet areas of this region.

Tablulations have been included in Tables 1, 10, and 11 for the remaining zones in the study area. These tabulations represent the physiographic units of highest archaeological potential. The Kaskaskia bluff and floodplain resource zones have essentially been combined here although site occurrence data has been presented separately. Additional correlation data is presented in Tables 12 and 13.

A UTM grid method for estimating resource zone coverage and site potential

for the Mississippi floodplain area and the western portions of the Mississippi bluffs and uplands will be described briefly in this context. This technique will be presented in more detailed form in a future publication. Originally, this method was devised by the author and James W. Porter as a means of estimating general coverage actually accomplished and coverage still needed for particular areas within Monroe and Randolph Counties. USGS 7½' quadrangle maps from the Historic Sites Surveys undertaken in this area, with area coverage already plotted, were utilized in the present study. Linder (et al. 1975: 32) had previously calculated this coverage by recording estimated site sizes for each quadrangle (Tables 14 and 15). Linder's estimates for an eight quadrangle area were then compared with UTM results from the present study (Tables 16 and 17). Linder's actual coverage percentage of 26% for both the floodplain and upland zones was only slightly higher than the UTM coverage estimates for this same area (i.e. 20.3% for North UTM and 19.9% for East UTM). This suggests that the technique utilized is potentially useful in other resource areas of Illinois, especially where future area management policies require coverage estimation.

The method involves the use of the Universal Transverse Mercator (UTM) system of grid location (Edwards 1969) to point plot the presence and absence of covered, non-covered, and site areas along individual UTM grid lines, which are spaced 1,000 meters apart. The present grid consists of 60 North UTM grid transects and 45 East UTM grid transects which cross through eight 7½' USGS quadrangles in Monroe and Randolph Counties. Millimeter measurements were taken along each grid transect and information delineating water, marsh, urban, levee, highway, site area, surveyed area, and potentially surveyable area, was recorded. These length measurements were converted into meters and kilometers. Unsurveyable land, such as bodies of water, was discarded as were urban units, although in the latter case, urban areas may still have substantial archaeological

potential (eg. through garden or backyard surveys).

Floodplain grids were measured from the west bank of the Mississippi River (thus including the Mississippi River) to an arbitrary point along the bluff face. Bluff or upland grids extended from this point to the eastern edge of each quadrangle. Thus, while all of the floodplain was sampled with this technique, only a portion of the uplands was considered. Linder's estimates were also confined to these same quadrangle limits. The estimates can, therefore, be compared. It should be noted that coverage is considerably less in upland zones than is indicated in both estimates. We would speculate that for the entire Mississippi bluff zone, less than .5% coverage has been accomplished at this time.

Several of the transects utilized in this study have been drawn in profile across the Mississippi River floodplain to emphasize the nature of coverage as well as the general nature of terrain in a portion of this area (Figs. 8 and 9).

The recent FAP-413 surveys sponsored by the Illinois Department of Transportation and the Illinois Archaeological Survey have also produced a data base consisting of both site and non-site data. This data originated in a corridor survey within the proposed I-270 highway right of way. The methods of this survey have already been briefly discussed. The proposed highway alignments cross a number of physiographic units in the northern American Bottom. This transect lies approximately northeast of the Cahokia site area and runs just east and west of the presently canalized Cahokia Creek. The proposed alignment then enters the bluffs near the Indian Creek outlet where it breaks up into a number of alignments criss-crossing the uplands of Madison County.

Without detailing the location of each site, this transect survey crossed nearly 20% of site area within the floodplain and about 10-15% of site area

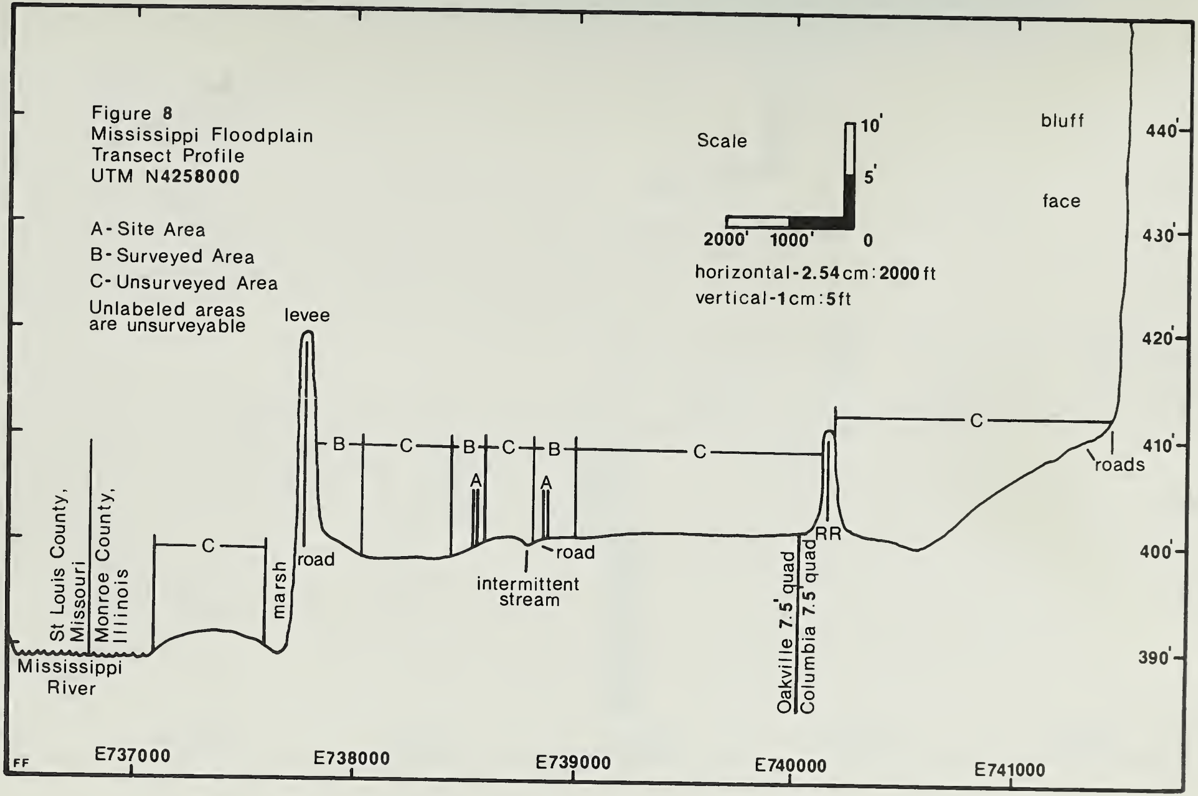


Figure 8
Mississippi Floodplain
Transect Profile
UTM N4258000

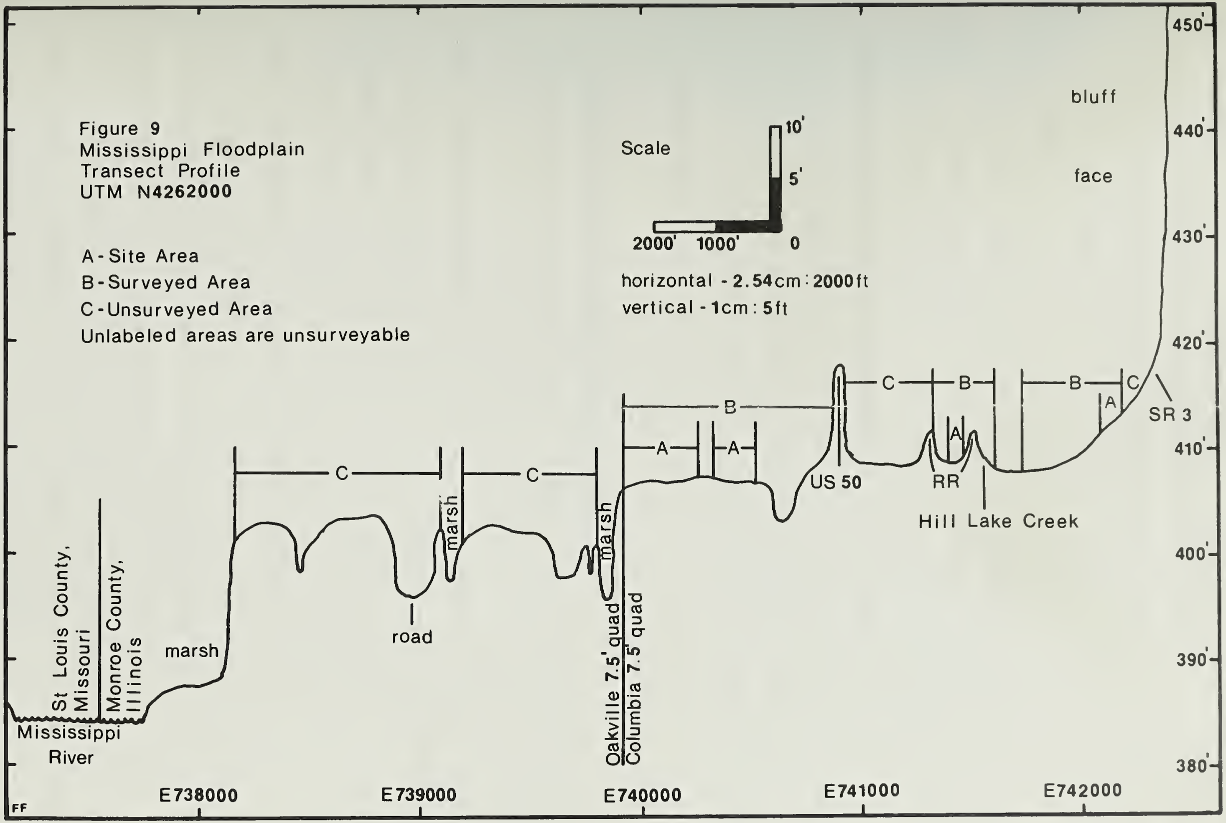


Figure 9
Mississippi Floodplain
Transect Profile
UTM N4262000
A - Site Area
B - Surveyed Area
C - Unsurveyed Area
Unlabeled areas are unsurveyable
Scale
10'
5'
2000' 1000' 0
horizontal - 2.54cm : 2000ft
vertical - 1cm : 5ft
bluff
face
St Louis County, Missouri
Monroe County, Illinois
Mississippi River
marsh
road
Oakville 7.5' quad
Columbia 7.5' quad
US 50
RR
Hill Lake Creek
SR 3
450'
440'
430'
420'
410'
400'
390'
380'
E738000
E739000
E740000
E741000
E742000
FF

in the uplands. This figure was calculated from site/non-site data. Sites occurred in virtually every kind of physiographic feature in this corridor, with sites occurring most commonly on old channel banks and colluvial outwash areas in the floodplain and on bluff lobes or ridges overlooking creek valleys in the uplands.

The primary results of this study are presented in ranked-occurrence tables. The UTM grid study and the highway transect figures are included as suggested methods estimating coverage and evaluating site/non-site data in the archaeological resource zones defined in this project. Site size and cultural affiliation information has not been incorporated here. However, a correlation between these variables and physiographic locales (e.g. confluence or stream outlet locales) may prove useful in future studies stemming from this project.

V. RECOMMENDATIONS AND FUTURE MANAGEMENT NEEDS

The emphasis of this study has been on where sites are located without regard to settlement type, size, or cultural affiliation. Site location models may in the future be refined so as to include those aspects. Based on the results of this study one cannot be convinced that topographic factors have played the most significant role in site distributions in this study area. Cultural patterns, social systems, or trade network proxemics may be more important in regard to settlement area selection than specific topographic units. The primary settlement factor for all cultural periods seems to have been proximity to, and elevation above, water. Vegetation regimes may have also played a significant role in settlement selection, but, in the authors opinion, these regimes are not static entities and must be reconstructed for each temporal period recognized. Given the growing evidence that past climatic changes have caused significant fluctuations in vegetation regimes in North America, it

cannot be automatically assumed that 1830 floral environments of the Kaskaskia drainage area were identical to those existing during the Archaic or Mississippian periods, 600 to 6,000 years ago.

It has not been possible to establish a single model of site occurrence for the Kaskaskia basin area, largely because of incomparable records of archaeological and physiographic data for the archaeological resource zones defined. More localized areal models, e.g. for tributary river valleys, may be more practical for site resource management purposes since physiographic units are more internally consistent within these smaller areas.

There are a number of pressing needs in this area which can only be resolved by long term survey programs utilizing consistent sampling and recording techniques. This entire area is critical to our understanding of prehistoric aboriginal life in North America. Much valuable information has already been lost due to poor management policies and poorly developed archaeological research designs. It is proposed that surveys be continued in all areas of the Kaskaskia drainage basin and that certain areas such as the Kaskaskia basin uplands, upper Kaskaskia River Valley, and the Mississippi bluffs and uplands, receive more extensive coverage in the future.

Predictive models are not substitutes for continual long term coverage programs in the zones discussed. While archaeologists can never hope to locate every site location in these zones (i.e. buried sites) efforts should be made at this time to preserve as much as possible of this dwindling resource. The formulation of predictive models can in this sense, only be justified <u>if</u> they serve to augment the present data base in both a <u>quantitative</u> and <u>qualitative</u> manner.

Based on the preliminary results of this study, it is possible to devise a research design for testing several hypotheses suggested by this study. For example, at least three significant prehistoric settlement locales occur within

the American Bottom of Monroe and Randolph Counties. These include old channel or meander banks, colluvial outwash areas and stream outlet locales. Each of these units can be tested by additional systematic surveys.

It is proposed that a transect survey with definable corridor limits be undertaken along the floodplain-bluff outwash area. This corridor would run approximately in a north to south direction and would include all colluvial outwash areas between Alton and Chester. Historic Sites Surveys have already demonstrated that these kinds of features have high site potential.

A second survey of stream outlet locales could be accomplished during the transect survey since stream outlet areas often occur near or within colluvial outwash zones. Both the floodplain and adjacent bluff lobes above this zone would be covered. It is predicted, at this time, that such zones will contain a number of site resources. It is also highly probable that sites are buried under colluvial deposits in stream outlet locales. Future survey projects should include a testing design for such areas.

Old channel banks can be surveyed by utilizing either a North or East UTM transect corridor through portions of the American Bottom. These surveys should emphasize not only site areas but non-site areas within old channel bank locales. A UTM transect survey is suggested here as a control for physiographic sampling biases which might occur in a more unsystematic survey of general channel bank locales.

Within the Mississippi bluffs it would be useful to sample sinkhole edges and the headwaters of small creek ravines. Virtually no surveys have been undertaken in these areas. In light of Carmichael's upland survey of kettle depressions, it is suggested that sinkhole edges in this area will also produce new site localities.

For other archaeological zones of the Kaskaskia basin, it is suggested that general surveys be undertaken which are aimed at recording coverage of

areas which have not yet been surveyed. In many instances it is not known which areas have already been covered since these records do not exist. Systematic total coverage surveys would be preferable at this time to limited transect surveys. In terms of evaluating site potentials in this area, broad zonal surveys would be more productive and more useful for resource management and archaeological concerns over a long period of time.

It should be emphasized, in concluding, that zones containing low densities of sites should not be excluded from future survey designs. Many of these areas have simply never been surveyed. More importantly, however, the concern is expressed that areas of low potential, as defined by future systematic surveys, will be ignored or written off as insignificant. Some resources within such zones may, however, have anthropological or archaeological significance. Site density studies, in this regard, may have value for future general management concerns in this area (Benchley 1976; Hentzelman 1977), but are of little utility in evaluating the qualitative aspects of prehistoric cultural development.

Table 1

Study Area Counties and Their Natural Divisions

	I	II	III	IV	V	VI	VII
Bond	X						
Clinton	X						
Fayette	X						
Madison	X			X			X
Marion	X	X					
Monroe	X	X			X		X
Montgomery	X						
Moultrie			X				
Randolph		X			X	X	X
St. Clair	X	X		X	X		X
Shelby	X		X				
Washington	X	X					
Champaign			X				
Douglas			X				

Key:
I: Southern Till Plain, Effingham Plain Section (9a)
II: Mt. Vernon Hill Country Section (9b)
III: Grand Prairie Section (4a)
IV: Middle Mississippi Border Glaciated Section (8a)
V: Ozark, North (11a)
VI: Ozark, Central (11b)
VII: Lower Mississippi Bottomlands, North (12a)

Table 2

General Physiographic Features Within the Natural Divisions of the Kaskaskia Study Area*

	I	II	III	IV	V	VI	VII
Topography							
level to rolling upland	X	X					
floodplain	X	X	X	X	X	X	
ravines	X	X	X	X	X	X	
river bluff	X			X	X		
lake plains	X						
dissected till plain		X	X				
rolling till plain			X				
sinkhole plain				X	X		
hills						X	
stream canyons						X	
meander scars							X
glacial land forms	X						
river floodplain							X
Bedrock							
sandstone outcrops	X	X	X			X	
dolomite	X						
limestone		X	X	X	X		X
shale		X	X				
coal		X	X				
caves				X	X		
sinkholes					X		
Aquatic Habitats							
prairie potholes	X						
rivers	X	X	X				
creeks	X	X	X	X	X	X	
marsh	X	X	X				X
oxbow lakes		X	X				X
sinkholes				X			
springs					X		
sinkhole ponds					X		
Mississippi River							X
creeks and streams							X

Key:
- I: Grand Prairie Division (4), Grand Prairie Section (4a)
- II: Southern Till Plain Division (9), Effingham Plain Section (9a)
- III: Southern Till Plain Division (9), Mt. Vernon Hill Country Section (9b)
- IV: Middle Mississippi Border Division (8), Glaciated Section (8a)
- V: Ozark Division (11), Northern Section (11a)
- VI: Ozark Division (11), Central Section (11b)
- VII: Lower Mississippi River Bottomlands Division (12), Northern Section (12a)

* (All terms after Schwegman 1973)

Table 3

Archaeological Resource Zone Site Frequency Distribtions (70% Sample)

Zones	No. of Sites	%
Mississippi River Floodplain	580	32.7
Mississippi Bluffs	183	10.3
Kaskaskia River Floodplain	177	10.0
Kaskaskia River Bluffs	262	14.8
Kaskaskia Tributary Floodplains	94	5.3
Kaskaskia Tributary Bluffs	330	18.6
Kaskaskia Basin Uplands	112	6.3
Kaskaskia-Mississippi Bluff Confluence	35	2.0
Totals	1773	100.0

Combined Zones	No. of Sites	%
Mississippi River Floodplain and Bluffs	763	43.0
Kaskaskia River Floodplain and Bluffs	439	24.8
Kaskaskia Tributary Floodplain and Bluffs	424	23.9
Kaskaskia Basin Uplands	112	6.3
Kaskaskia-Mississippi Bluff Confluence	35	2.0
Totals	1773	100.0

Table 4

Ranked Site-Physiographic Occurrences
Kaskaskia River Floodplain (f=177)

	Frequency*	%
<u>Topography</u> (f=177)		
Isolated Ridge or Small Rise	52	29.4
Lower Terrace	36	20.3
Channel or River Bank	23	13.0
Level Area (Non-terraced)	12	6.8
Upper Terrace	9	5.1
Bluff Base	8	4.5
Low Swampy Areas	8	4.5
Upland Extensions into a Floodplain	8	4.5
Creek or Stream Terrace	6	3.4
Multiple Rises	5	2.8
Upper Terrace and Bluff Lobe Spurs	4	2.3
Totals	171	96.6
<u>Elevation in ft.</u> (f=127)		
431-450	33	26.0
426-430	27	21.3
381-390	10	7.9
400-405	8	6.3
451-470	6	4.7
581-600	6	4.7
641-660	6	4.7
661-680	6	4.7
361-380	4	3.2
416-420	4	3.2
561-580	4	3.2
471-490	3	2.4
Totals	117	92.3
<u>Soils</u> (f=127)		
unknown	99	80.0
sandy silt	8	6.3
sand	7	5.5
sandy loam	3	2.4
loam (?)	3	2.4
Totals	120	96.6

*site physiographic occurrences at less than 2% levels are not given.

Table 5

Ranked Site-Physiographic Occurrences
Kaskaskia River Bluffs and Upland (f=262)

	Frequency*	%
Topography (f=260)		
Dissected Upland Edge	183	70.4
Vertical Bluff Edge	36	13.8
Bluff Lobe Extensions into Floodplain	25	9.6
Floodplain Terrace and Sloping Bluffs	7	2.7
Totals	251	96.5
Elevation in ft. (f=143)		
431-450	20	14.0
416-420	18	12.6
451-470	16	11.2
501-520	16	11.2
661-680	15	10.5
400-405	13	9.1
491-500	9	6.3
581-600	7	4.9
521-540	6	4.2
641-660	4	2.8
381-390	3	2.1
426-430	3	2.1
541-560	3	2.1
Totals	133	93.1
Soils (f=148)		
unknown	114	77.0
loam (?)	10	6.8
clay	7	4.7
sandy silt	6	4.0
Totals	137	92.5

*site physiographic occurrences at less than 2% levels are not given.

Table 6

Ranked Site-Physiographic Occurrences
Mississippi Bluffs and Uplands (f=183)

	Frequency *	%
Topography (f=183)		
Ridge Tops and Lobes	55	30.1
Bluff Edge	47	25.7
Creek Terraces	18	9.8
Dissected Upland Slopes	14	7.7
Hollow Slopes	11	6.0
Colluvial Bluff Edge Terraces	10	5.5
Vertical Rocky Bluffs	7	3.8
Bluff Ridge Lobes Extending Off of Bluff Summits	5	2.7
Bluff Lobes Extending into River Valleys	5	2.7
Colluvial Fan Within Bluff Hollow	4	2.2
Totals	176	96.2
Elevation in ft (f=183)		
491-500	14	7.7
521-540	14	7.7
581-600	14	7.7
431-450	13	7.1
641-660	13	7.1
541-560	11	6.0
601-620	11	6.0
416-420	9	4.9
471-490	9	4.9
701-720	9	4.9
451-470	8	4.4
501-520	8	4.4
621-640	8	4.4
426-430	6	3.3
400-405	5	2.7
751-770	5	2.7
681-700	4	2.2
721-750	4	2.2
771-800	4	2.2
Totals	169	92.5
Soils (f=183)		
loess	115	62.8
unknown	30	16.4
clayey loess	12	6.6
bedrock or stony talus	6	3.3
clay	5	2.7
silty clay loess	4	2.2
Totals	172	94.0

*site physiographic occurrences at less than 2% levels are not given.

Table 7

Ranked Site-Physiographic Occurrences
Mississippi River Floodplain (f=580)

	Frequency*	%
Topography (f=580)		
Old Channel Banks	232	40.0
Colluvial Outwash Fans	75	12.9
Level Areas	55	9.5
Small Rises or Undefined Ridges	39	6.7
Multiple Ridge and Swale Units	23	4.0
Modern Lake Bank	15	2.6
Old Natural Levee	15	2.6
Stream Terrace	15	2.6
Totals	469	80.9
Elevation in ft (f=580)		
400-405	159	27.4
381-390	151	26.0
391-399	110	19.0
416-420	54	9.3
406-410	36	6.2
411-415	27	4.7
431-450	12	2.1
Totals	549	94.7
Soils (f=580)		
silty clays	145	25.0
silts	88	15.2
sands	46	7.9
silt loams	43	7.4
loess	42	7.2
sandy silt	38	6.6
clay (gumbo)	28	4.8
sandy loam	15	2.6
silty sand	15	2.6
Totals	460	79.3
Water Sources (f=580)		
creek or stream	267	46.0
lake	129	22.2
slough	55	9.5
slough and lake	44	7.6
slough, lake, and stream	28	4.8
slough and creek	20	3.5
slough and natural springs	16	2.8
Totals	559	96.4

*site physiographic occurrences at less than 2% levels are not given.

Table 8

Mississippi River Floodplain
Ranked Factor Correlations for Old Channel Banks
and Colluvial Outwash Fans

A. Old Channel Banks (f=232)

Soils	Elevation (ft.)	Nearest Water	Frequency*	%
silty clay	400-405	stream	21	9.05
silty clay	381-390	stream	9	3.88
silty clay	381-390	lake	9	3.88
silty clay	400-405	lake	9	3.88
silt	381-390	stream	8	3.49
silt	381-390	lake	8	3.49
silty clay	391-399	stream	6	2.59
sandy silt	400-405	slough	5	2.16
Totals			75	32.42

B. Colluvial Outwash Fans (f=75)

Soils	Elevation (ft.)	Nearest Water	Frequency	%
loess	400-405	stream	11	14.7
silt	391-399	stream	4	5.3
silt	400-405	stream	3	4.0
silt	381-390	stream	2	2.7
loess	381-390	stream	2	2.7
sand	391-399	stream	2	2.7
loess	391-399	stream	2	2.7
silty clay	406-410	stream	2	2.7
sandy silt loess	406-410	stream	2	2.7
loess	411-415	stream	2	2.7
silt loam	411-415	stream	2	2.7
Totals			34	45.33

*Correlations exclude occurrences at less than 2%.

Table 9

Ranked Site-Physiographic Occurrences
Kaskaskia River Tributrary Floodplains (f=94)

	Frequency*	%
Topography (f=94)		
Level Areas (Non-terraced)	26	27.7
Rise or Ridge	24	25.5
River Bank	13	13.8
Floodplain and Sloping Upland Edge	12	12.8
Lower Stream Terrace	12	12.8
Upper Stream Terrace	2	2.1
Totals	89	94.7
Elevation in ft (f=83)		
431-450	14	16.9
471-490	11	13.2
581-600	8	9.6
416-420	7	8.4
381-390	6	7.2
541-560	6	7.2
426-430	5	6.0
451-470	4	4.8
491-500	4	4.8
561-580	4	4.8
521-540	3	3.6
601-620	3	3.6
400-405	2	2.4
501-520	2	2.4
661-680	2	2.4
Totals	81	97.3
Soils (f=88)		
unknown	29	33.0
clayey loess (?)	16	18.2
sandy silt	13	14.8
silt	7	8.0
silt loam	6	6.8
clay	5	5.7
loess	4	4.6
sandy clay	3	3.4
sand	2	2.3
loam (?)	2	2.3
Totals	87	99.1

*site physiographic occurrences at less than 2% levels are not given.

Table 10

Ranked Site-Physiographic Occurrences
Kaskaskia River Tributary Bluffs (f=330)

	Frequency*	%
Topography (f=330)		
Edge of Uplands	256	77.6
Vertical or Steep Bluff Edge	27	8.2
Bluff Lobe Extensions into Floodplain	19	5.8
Floodplain Terrace and Sloping Bluffs	7	2.1
Totals	309	93.7
Elevation in ft (f=316)		
431-450	87	27.5
451-470	43	13.6
471-490	35	11.8
491-500	25	7.9
501-520	23	7.3
601-620	17	5.4
621-640	15	4.8
416-420	14	4.4
581-600	13	4.1
541-560	10	3.2
521-540	8	2.5
561-580	8	2.5
Totals	298	95.0
Soils (f=316)		
loess	96	30.4
clayey loess (?)	74	23.4
silt loam	64	20.2
unknown	45	14.2
clay	11	3.5
sandy loess	8	2.5
sandy silt	7	2.2
Totals	305	96.7

*site physiographic occurrences at less than 2% levels are not given.

Table 11

Ranked Site-Physiographic Occurrences
Kaskaskia Basin Dissected Upland (f=72*)

	Frequency **	%
Topography (f=72)		
Undulating Ridge	39	54.2
Upland Knoll	8	11.1
Creek Terrace	7	9.7
Swales	4	5.6
Drainage Divide	3	4.2
Multiple Ridges	3	4.2
Level Area	2	2.8
Totals	66	91.8
Elevation in ft (f=66)		
621-640	17	25.8
661-680	6	9.1
501-520	5	7.6
431-450	4	6.1
471-490	4	6.1
491-500	4	6.1
561-580	4	6.1
601-620	4	6.1
451-470	3	4.6
541-560	3	4.6
581-600	3	4.6
416-420	2	3.0
641-660	2	3.0
Totals	61	92.8
Soils (f=71)		
unknown	34	47.9
silt loam	17	23.9
loess	11	15.5
clay	2	2.8
sand	2	2.8
sandy loam	2	2.8
Totals	68	95.7

*Does not include data from Carmichael (1977) survey.

** site physiographic occurrences as less than 2% levels are not given.

Table 12

Kaskaskia Tributary Bluffs
Ranked Factor Correlations for Dissected Upland Edge Units (f=246)
Soil Texture-Elevation-Topography Correlation

Soil Texture	Elevation (ft.)	Frequency*	%
loess	431-450	48	19.51
clayey loess	471-490	23	9.35
silt loam	431-450	17	6.91
loess	451-470	13	5.28
clayey loess	491-500	13	5.28
clayey loess	501-520	11	4.47
clayey loess	451-470	10	4.07
silt loam	451-470	9	3.66
clayey loess	416-420	8	3.25
loess	471-490	7	2.85
silt loam	501-520	7	2.85
silt loam	621-640	6	2.44
sandy loess	431-450	6	2.44
silt loam	541-560	5	2.03
Totals		183	74.39

*Correlations exclude occurrences at less than 2%.

Table 13

Kaskaskia River Bluffs
Ranked Factor Correlations for Dissected Upland Edge Units (f=91)
Elevation-Topography Correlations

Elevation (ft.)	Frequency*	%
416-420	18	19.78
661-680	14	15.38
400-405	12	13.19
431-450	12	13.19
451-470	8	8.79
491-500	7	7.69
501-520	7	7.69
381-390	3	3.30
426-430	3	3.30
641-660	3	3.30
681-700	2	2.20
Totals	89	97.81

*Correlations exclude occurrences at less than 2%.

Table 14

UTM Grid Totals for Partial Areas of the Mississippi River Upland

North UTM Grid Totals (in kilometers)

USGS 7½' Quadrangle*	A	B	C
Selma	9.5	0.8	0.8
Renault	106.5	1.5	0.1
Valmeyer	44.5	2.8	0.3
Bloomsdale	0.7	0.1	---
Prairie du Rocher	2.9	0.2	1.4
Oakville	1.9	0.1	0.1
Columbia	124.7	0.1	0.1
Kaskaskia	16.8	---	---

East UTM Grid Totals (in kilometers)

USGS 7½' Quadrangle**	A	B	C
Selma	10.3	1.0	0.2
Renault	110.2	1.8	0.3
Valmeyer	43.5	3.2	0.5
Bloomsdale	1.2	---	---
Prairie du Rocher	72.8	5.0	1.2
Oakville	---	---	---
Columbia	123.6	0.6	0.3
Kaskaskia	25.0	---	---

Key: A: Total Coverage Potential
B: Area Coverage
C: Site Area

* Includes UTM's N426500-4206000
** Includes UTM's E730000-763000 and E237000-247000

Table 15

UTM Grid Totals for the Mississippi River Floodplain

North UTM Grid Totals (in kilometers)

	A	B	C
USGS 7½' Quadrangle*			
Selma	62.0	10.9	2.0
Renault	32.3	8.6	1.4
Valmeyer	87.6	14.3	1.8
Bloomsdale	47.6	2.6	0.5
Prairie du Rocher	56.3	19.9	2.5
Oakville	43.0	3.0	0.6
Columbia	17.9	2.1	0.5
Kaskaskia	18.7	2.8	0.5

East UTM Grid Totals (in kilometers)

	A	B	C
USGS 7½' Quadrangle**			
Selma	61.6	10.4	3.2
Renault	38.5	8.8	1.7
Valmeyer	83.6	13.3	1.4
Bloomsdale	45.1	2.0	0.3
Prairie du Rocher	52.3	19.9	2.6
Oakville	39.9	2.6	0.2
Columbia	22.9	1.8	0.4
Kaskaskia	18.3	3.0	0.5

Key:
A: Total Coverage Potential
B: Area Coverage
C: Site Area

* Includes UTM's N4265000-420600
** Includes UTM's E730000-763000 and E237000-247000

Table 16

Historic Sites Survey Coverage Estimates*

USGS 7½' Quadrangle	Area km^2	Area Covered	% Covered
Columbia	20.9	2.2	10.0
Oakville	25.5	3.1	12.0
Valmeyer	72.5	17.1	24.0
Selma	33.6	11.5	34.0
Renault	34.1	11.4	33.0
Bloomsdale	18.8	2.3	12.0
Prairie du Rocher	52.8	22.4	42.0
Kaskaskia	16.3	1.9	12.0
Totals	274.5	71.9	26.2%

* (Adapted from Linder et al. 1975: 32)

Table 17

UTM Coverage Estimates for the Mississippi River Floodplain and Uplands

	North UTM		East UTM	
	Floodplain	Upland	Floodplain	Upland
Total Area	365.4 km	307.5 km	362.2 km	386.6 km
Surveyed Area	64.2 km	5.6 km	61.8 km	11.6 km
Site Area	9.8 km	2.8 km	10.3 km	2.5 km
% of Area Surveyed	17.6 %	1.8 %	17.1 %	3.0 %
% of Site Area Within Surveyed Units	15.3 %	50.0 %	16.7 %	21.6 %
% of Site Area in Total Area	2.7 %	0.9 %	2.8 %	0.6 %

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Abbreviations:

H.S.S.: Historic Sites Survey: Archaeological Reconnaissance of Selected Areas in the State of Illinois. Illinois Archaeological Survey.

SIMARPC: Southwestern Illinois Metropolitan and Regional Planning Commission.

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